KNOWLEDGE

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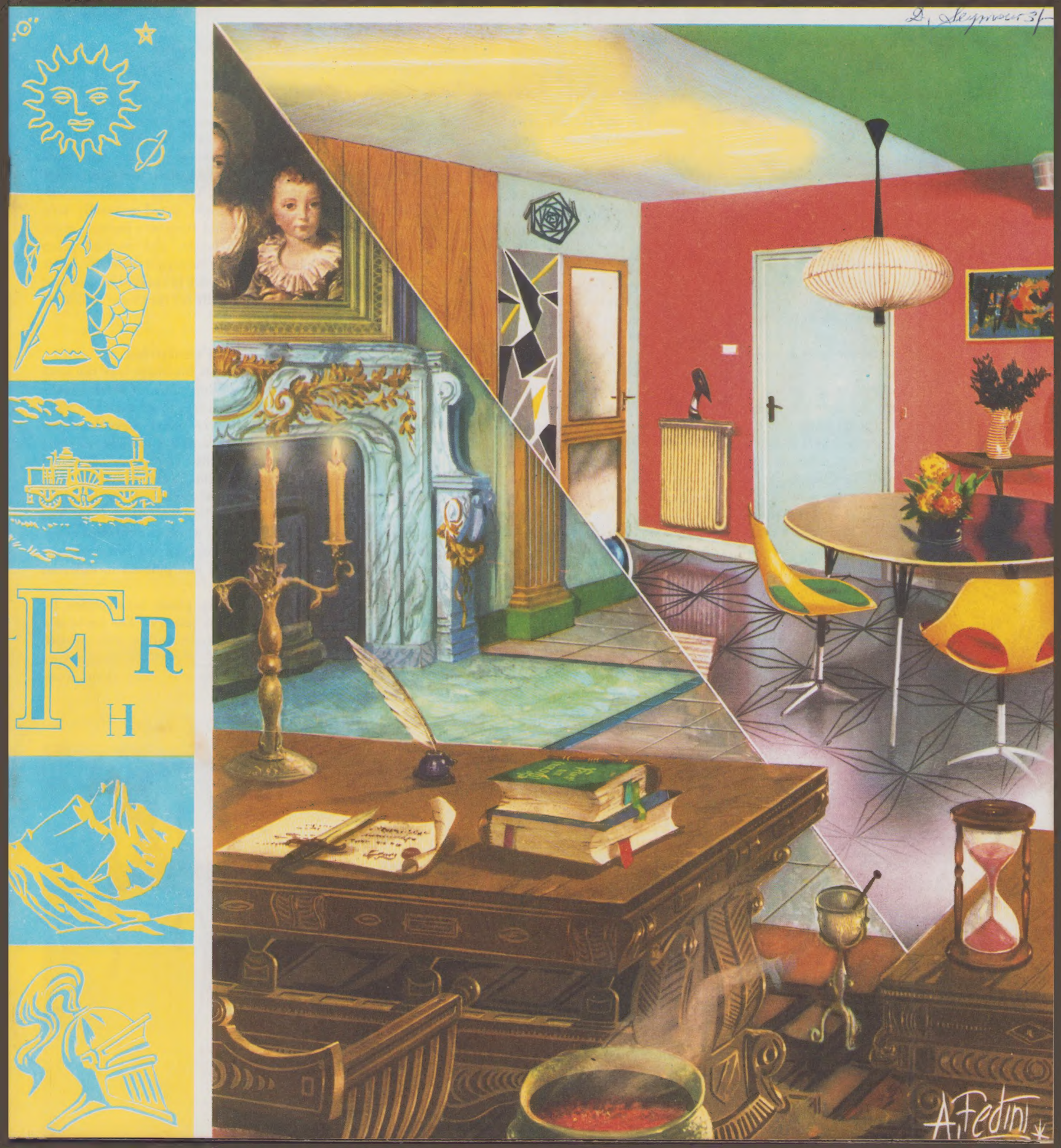

FAR & WIDE

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The new colour supplement *FAR & WIDE* is out this week.

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FURNITURE

As soon as men gave up a nomadic existence and settled down to make their homes in one place, they began to need furniture; furniture to keep their clothes in, furniture to rest on, and furniture to eat off. But this happened at different times in different parts of the world. Just as each civilisation, and indeed each country, develops a different style of architecture and a different style of dress, so each people has its own style of furniture. The Ancient Chinese, Indians, and Egyptians were the first to evolve distinct styles of furniture. These were followed by the Greeks and Romans, who established such high standards of design in their furniture (as in many other arts) that European designers ever since have periodically reverted to them.

A people's standard of living is always reflected in its furniture. The first furniture a people builds is usually purely *functional* – that is, it has to do no more than serve its purpose. But as their lives become more settled economically and politically so their furniture becomes more important to them. We shall just examine English furniture, the story of which only really begins in the 15th century. Before this there were few rich men except the aristocracy, who were more interested in open-air pursuits than in filling their houses with beautiful things. But from the 15th century the craft of producing fine furniture flourished in England. It catered for the aristocracy and gentry who had made a fortune out of the Hundred Years War, and the merchants whose wealth and numbers were increasing.

Four stages

The development of English furniture can be divided into four stages: the 15th and 16th centuries were the age of the carpenters who carved furniture along with many other wooden objects, usually in oak; from the Restoration (1660) to the mid-18th century was the age of the cabinet-makers, far more highly skilled craftsmen who specialised in fine furniture and used walnut and mahogany as well as oak; the second half of the 18th century was the age of the designers who placed emphasis on the form as well as the execution of furniture; the 19th and 20th centuries saw the introduction of revolutionary materials like steel and plastic, new processes, and mass production.

Architectural styles have always greatly influenced fashions in furniture. The elegant Regency houses, for instance, had light, elegant furniture; while the heavy Victorian buildings were crowded with dark, ornate furniture. The first furniture was purely functional and, being very simple, fitted naturally into its setting. Later, as both buildings and furniture became more elaborate, this was done more consciously, and we find great architects like Robert Adam designing furniture specially to fit their houses. And today, with people living in smaller houses and flats, we have 'unit' fittings and built-in furniture which is literally part of the house.

Carpenters of the 15th and 16th centuries

The most prominent piece of mediaeval furniture was the long table in the hall. This had a massive top made of thick planks placed on trestles, and benches made in sets to go with it. Chairs were heavy and box-like, and stools were much more common. Chests were indispensable; they were used for storage, as seats and travelling trunks, and even as beds. They were carved in beautiful Gothic tracery and their lids were attached with wrought-iron hinges. There were a few cupboards or *aumbries* which had panelled doors, pierced if they contained food. The *tester* or canopy of a mediaeval bed, from which the curtains hung, was suspended by ropes from the ceiling. All the furniture was made of oak, sometimes lime-whitened and painted in different colours.

Towards the end of the 15th century plank construction by carpenters and cofferers was replaced by joinery. The parts of a table, cupboard, chest, or chair were fitted together with mortice and tenon joints, and held with wooden pegs. Furniture-makers were now called joiners or cabinet-makers, and their work became increasingly light.

18th-century chairs (l. to r.): Queen Anne, with cabriole legs; Sheraton, painted and inlaid, 1793*; two Chippendales*

Previous page: contrasting interiors: *above*, a modern living room; *below*, Renaissance furniture in an 18th-century study.

DIURNAL BIRDS OF PREY

BIRDS that kill and eat other birds, mammals, or reptiles are known as raptorial birds or birds of prey. There are two quite distinct groups of these: hawks, eagles, and vultures, called diurnal because they are active by day; and owls, which are nocturnal, flying at night. We have already described the owls on page 836; in this article we shall look at the day-flying raptorial birds.

Finest of these are the eagles, of which there are many species distributed all over the world. Some tropical eagles feed on monkeys; the European golden eagle is capable of carrying off a lamb. The falcons and hawks are smaller than eagles, but some of them are wonderfully bold and swift in pursuit of their prey. Before the days of sporting guns falcons were used to hunt birds, such as ducks and pigeons, to supply the tables of people rich enough to employ men to train and control them.

Vultures and condors are degenerate birds of prey feeding mainly on carrion – that is, the flesh of animals that have been killed by another predator or have died naturally. The great condor of South America is the largest bird that flies.

A golden eagle returns to its nest with food for its young

Golden eagle (*Aquila chrysaetos*)
This magnificent bird is found in the wilder, mountainous parts of Europe, Asia, and North America, and exists in small numbers in the Scottish highlands. It feeds mainly on ground birds, like grouse and ptarmigan, and on hares, but will also eat young lambs and occasionally carrion. The eagle's nest, called its 'eyrie', is built on a ledge of a mountain cliff. It has a foundation of sticks and small branches and is lined with grass, heather, and bracken. Two eggs are laid as a rule but often only one chick survives.

FALCONS

The falcons have long, pointed wings and are among the swiftest of all birds. These were the birds chiefly used in the mediaeval sport of falconry; the peregrine falcon was 'the hawk for a lord', the hobby 'the young man's hawk', and the merlin (a small falcon not shown here) 'the lady's hawk'. The kestrel was very little used. Falcons do not build nests but use the deserted nests of other birds or breed on cliff ledges, in buildings, or in hollow trees.

Hobby
(*Falco subbuteo*)

Hobby. This is one of the smallest of the falcons, but the swiftest of them all. It is known to catch swallows and swifts on the wing, but also preys on insects. It always uses the abandoned nest of some other bird for breeding, usually that of a crow.

Kestrel. This beautiful little falcon is the only 'hawk' that is now found in any numbers in parts of Britain. Its habit of turning into the wind and hovering in one place with rapidly beating wings makes it very easy to recognise in flight. When it does this it is looking for mice and voles running in the grass; if it sees one it swoops down and seizes it. In this way kestrels are of great benefit to farmers and gardeners, and it is quite right that they should be strictly protected against the threat of extinction.

Kestrel
(*Falco tinnunculus*)

Peregrine falcon. The peregrine is the strongest and boldest of the falcons. As in most birds of prey, the female is larger than the male, and in the language of falconry she was the 'falcon' and her smaller mate the 'tiercel'. Peregrine falcons were used to hunt duck and herons, but in the wild they feed largely on pigeons, striking their prey down in mid-air. They are among the few birds found almost all over the world, and occur in every continent, except Antarctica, from the tropics to the perpetual snows.

Peregrine falcon
(*Falco peregrinus*)

HARRIERS

The raptorial birds forming this group are found in open country – moors, steppes, and marshland – with few trees. They are slender, with long tails and pointed wings, and their claws and beaks are less powerful than those of the falcons and eagles. They fly low over the ground searching for mice, voles, frogs, and other small animals, which they capture by a sudden pounce. Unlike almost all other birds of prey, they nest on the ground, usually among thick heather or reeds so that their nests are well concealed. In some of the harriers there is a great difference in appearance between the male and female. The hen harrier that is shown here is the male bird; the female is dark brown above and streaked brown and white below. Three kinds of harrier are found in Britain – the hen, Montague's, and the marsh harrier – but all are rather rare.

Hen harrier
(*Circus cyaneus*)

Sparrow hawk
(*Accipiter nisus*)

SPARROW HAWK

This is one of the short-winged hawks that usually hunt their prey on or near the ground. The sparrow hawk, now rare in Britain, makes its nest in trees.

Kite
(*Milvus milvus*)

KITE

The kite is a master of soaring flight, circling with wings outstretched, and can be recognised by its long wings and deeply forked tail. It lives on rabbits and other small animals. Kites used to be common in Britain but are now very rare.

GOSHAWK

This is one of the largest of the short-winged hawks and was used in falconry for hunting such game as ducks, geese, and hares. It is extremely swift in flight, and looks like a very big sparrow hawk. Goshawks live in the forests of Europe, Asia, and North America and are only occasional visitors to Britain.

Goshawk
(*Accipiter gentilis*)

Great condor. The condor of the Andes is the largest bird that flies, and its wing span may reach between 9 and 10 feet. It lives mainly in mountains, up to 18,000 feet. Condors have marvellous vision and soar at a great height, watching over a huge area of country. They do not feed only on carrion but hunt lambs and other small animals as well.

American vultures and condors resemble the Old World vultures but are classified in a separate suborder. The head of the American king vulture is shown below.

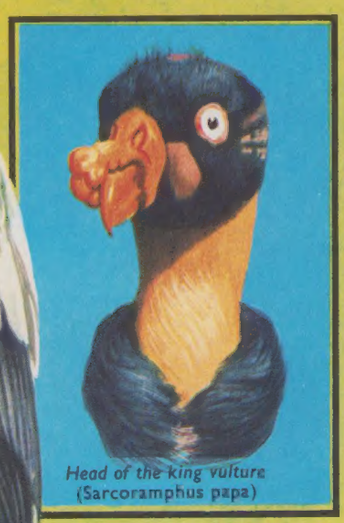
Secretary bird
(*Sagittarius serpentarius*)

SECRETARY BIRD

This African bird stands 4 feet tall and looks totally unlike any other bird of prey. It runs in open savannah country and lives by hunting all sorts of small animals, including snakes. Its name refers to the stiff feathers on its head, which look like the quill pens that secretaries used to carry behind their ears.

EGYPTIAN VULTURE

Vultures are degenerate birds of prey that feed mostly on carrion, though some of them catch and kill small animals as well. The Egyptian vulture is one of the most common of them and is found in Africa and the countries bordering the Mediterranean.

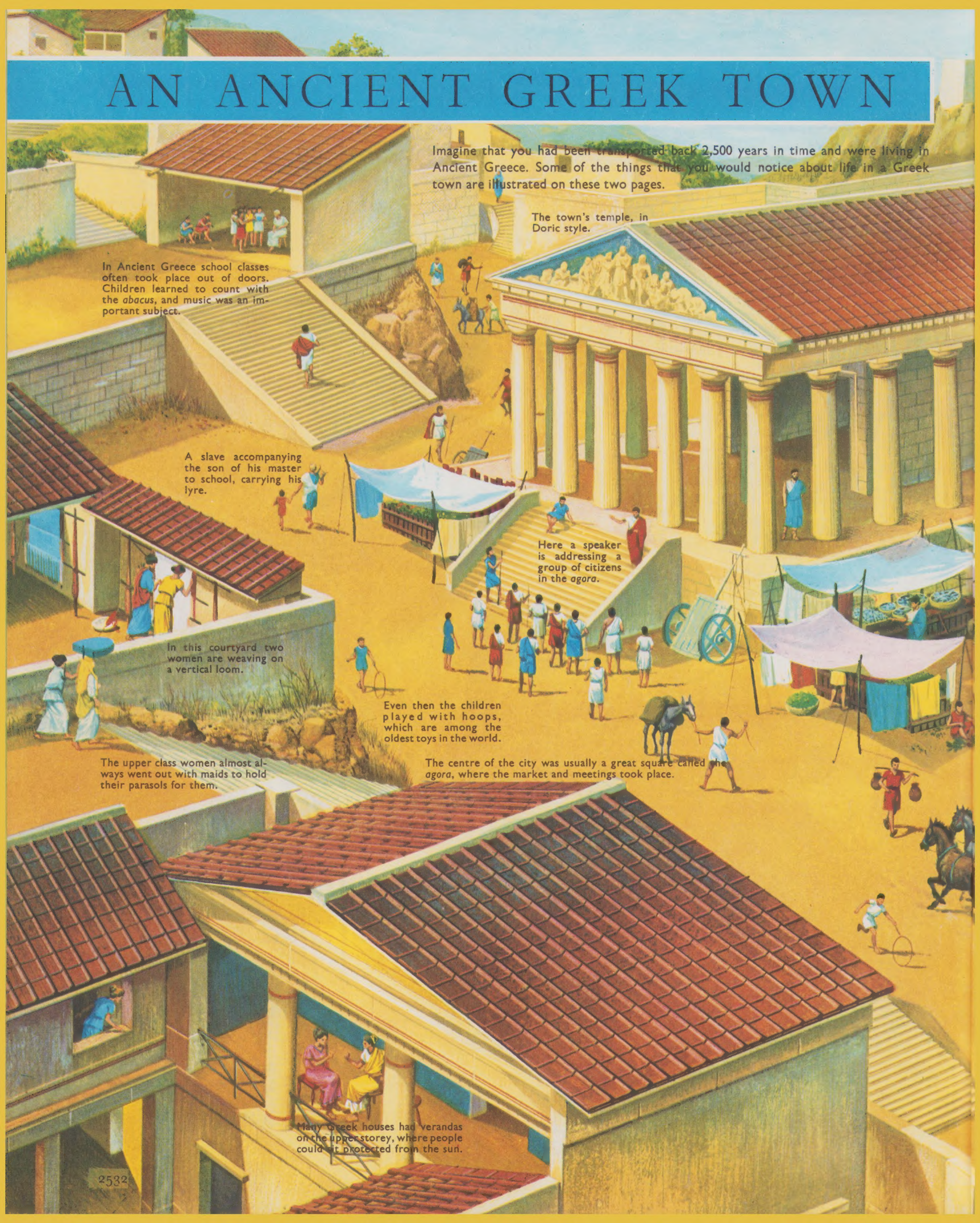


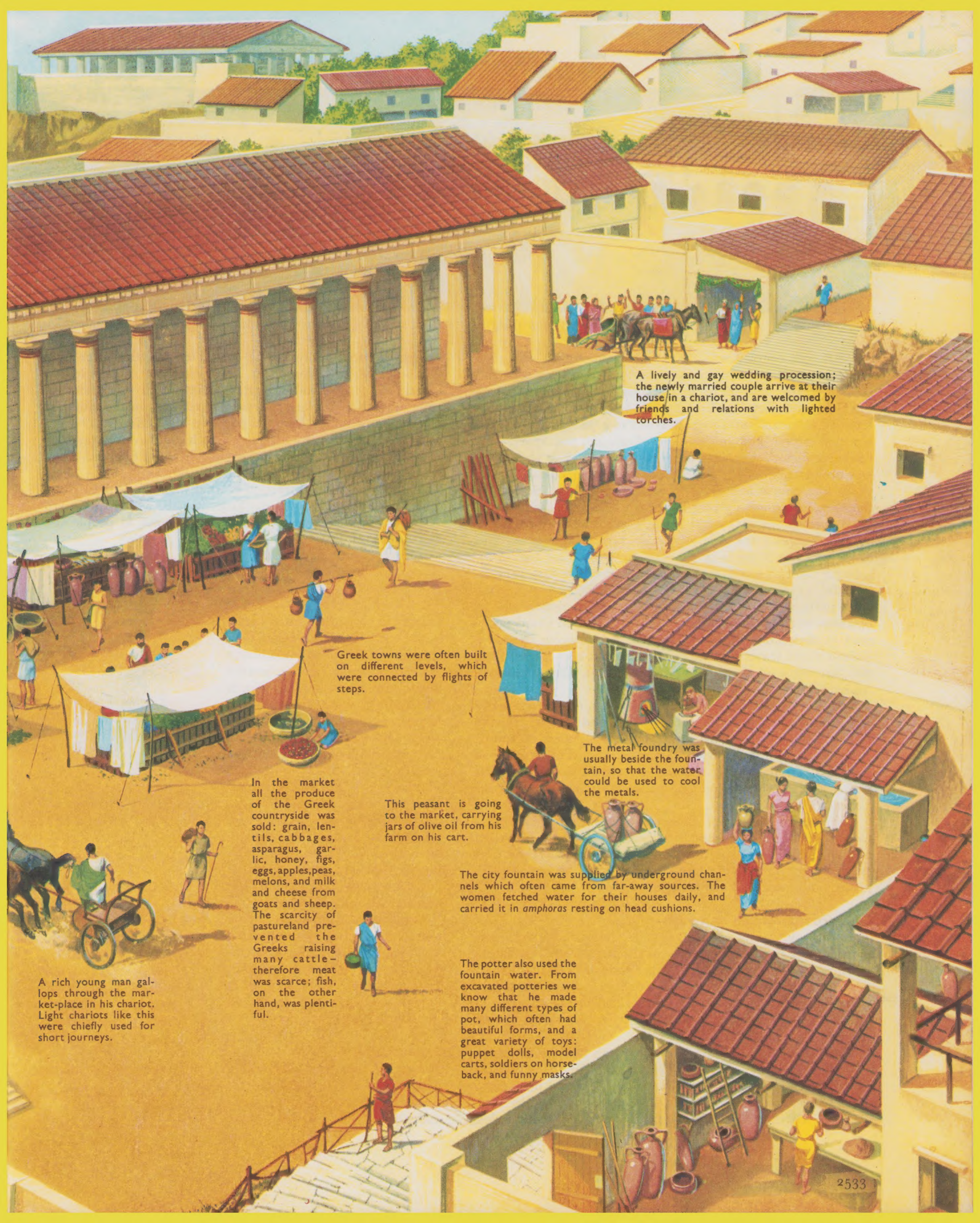
Head of the king vulture
(Sarcoramphus papa)

Egyptian
vulture
(*Neophron*
percnopterus)

Great condor
(*Vultur gryphus*)

AN ANCIENT GREEK TOWN


Imagine that you had been transported back 2,500 years in time and were living in Ancient Greece. Some of the things that you would notice about life in a Greek town are illustrated on these two pages.
The town's temple, in Doric style.
In Ancient Greece school classes often took place out of doors. Children learned to count with the *abacus*, and music was an important subject.
A slave accompanying the son of his master to school, carrying his lyre.
Here a speaker is addressing a group of citizens in the *agora*.
In this courtyard two women are weaving on a vertical loom.
Even then the children played with hoops, which are among the oldest toys in the world.
The upper class women almost always went out with maids to hold their parasols for them.
The centre of the city was usually a great square called the *agora*, where the market and meetings took place.
Many Greek houses had verandas on the upper storey, where people could sit protected from the sun.



A lively and gay wedding procession; the newly married couple arrive at their house in a chariot, and are welcomed by friends and relations with lighted torches.

Greek towns were often built on different levels, which were connected by flights of steps.

The metal foundry was usually beside the fountain, so that the water could be used to cool the metals.

This peasant is going to the market, carrying jars of olive oil from his farm on his cart.

In the market all the produce of the Greek countryside was sold: grain, lentils, cabbages, asparagus, garlic, honey, figs, eggs, apples, peas, melons, and milk and cheese from goats and sheep. The scarcity of pastureland prevented the Greeks raising many cattle – therefore meat was scarce; fish, on the other hand, was plentiful.

The city fountain was supplied by underground channels which often came from far-away sources. The women fetched water for their houses daily, and carried it in *amphoras* resting on head cushions.

A rich young man gallops through the market-place in his chariot. Light chariots like this were chiefly used for short journeys.

The potter also used the fountain water. From excavated potteries we know that he made many different types of pot, which often had beautiful forms, and a great variety of toys: puppet dolls, model carts, soldiers on horseback, and funny masks.

TRANSPORT IN

An early railway engine steams out of Venice, the historic city that symbolised so much that the railways

THE 19th century was the age of steam. Already by 1800 steam power was driving cotton mills, draining coal and copper mines, and invading the small metal workshops of Sheffield and Birmingham. The Industrial Revolution was founded on steam, but progress would soon have been checked if steam power had not also revolutionised transport. For, while the factory machines were grinding out their wares, the new proud 'iron horse' – the railway locomotive – was carrying goods and people farther and quicker than ever before. And soon steamships were plying the Seven Seas, and gradually in ports throughout the world thick, black smoke from grimy funnels heralded the eclipse of the days of tall masts and billowing sails; of the swift clippers and noble East Indiamen.

Suddenly the world was shrinking. For the first time in England railways enabled ordinary working people to visit other parts of the land; by mid-century seaside resorts such as Brighton were growing rapidly and city children gazed wide-eyed at their first glimpse of the sea. Adventurous men and women could leave their homes and start a new life in areas now accessible to them – the United States, Canada, South America, Australia. . . .

Railways could take people and freight to the ports; steamships could carry them to distant parts, and return with the products of these new lands: Australian wool, American wheat, Argentinian beef, and New Zealand mutton. The opening of the Suez Canal in 1869 allowed western ships to reach the Indian Ocean without the long hazardous voyage around the Cape of Good Hope.

The growing desire of European states to build empires caused the bold and spirited to colonise other lands. The more humble could now hope to see the famous cities of their own country. And it was transport that provided the key to these ideals, ambitions, and achievements.

The growth of the railways

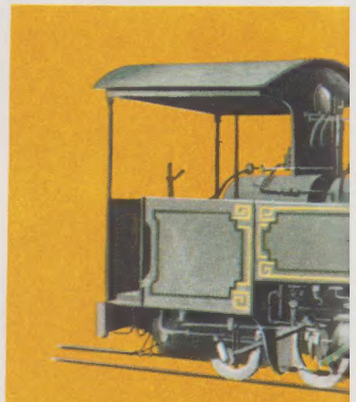
The railway, being closely tied to industrialisation, was pioneered in Britain – the home of the Industrial Revolution. In turn the railways spurred further industrial change themselves as iron and steel were demanded for rails, rolling stock, and engines. Other industries were helped by the lowering of freight charges and the speeding of deliveries caused by the advent of the railways.

The first successful steam locomotive ran between Stockton and Darlington in 1825. Five years later a line was built to join the great cotton town of Manchester with the prosperous port of Liverpool. The railway had come to stay, and by 1850 the total length of track in Britain had reached 6,000 miles.

The skeleton network was complete, and the succeeding decades saw extensions and improvements. A momentous addition was the London Underground which was started in 1863, and 20 years later trams were running in the cities, at first pulled by horses, but later powered by electricity.

By 1850, then, railway engines, which could average up to 40 mph on some journeys, had changed the face of England. They were beginning to do so elsewhere.

In 1830 only a small fraction of what we know as the United States was actually settled. True, canals and roads were spreading rapidly; but it needed the railroad to people the vast tracts of land west of the Mississippi River, and during the 1840s and 1850s the frontier of settlement was pushed ever westwards (see page 2065). The first railway to cross the United States was opened in 1869, and from then on migrants from eastern America as well as from Europe poured into Kansas, Nebraska, North and South Dakota, Arizona, and Minnesota, to farm their homesteads and send their produce to cities and nations throughout the world.



Engines like these caused an

What was happening in Britain and America was happening less rapidly everywhere: in France in the 1850s and 1860s, in Germany after 1860, in Russia and India by the 1870s, in Japan, Canada, and Australia during the last quarter of the century.

In all these countries and many more the railway was ending isolation, and creating new industries and national markets. Britain herself, by investing in foreign lands, helped to spread the network wide and far.

Steamships

Just as the railways had created a national economy, improvements in shipping created an international economy. By 1815 there

GROWTH OF ENGLISH

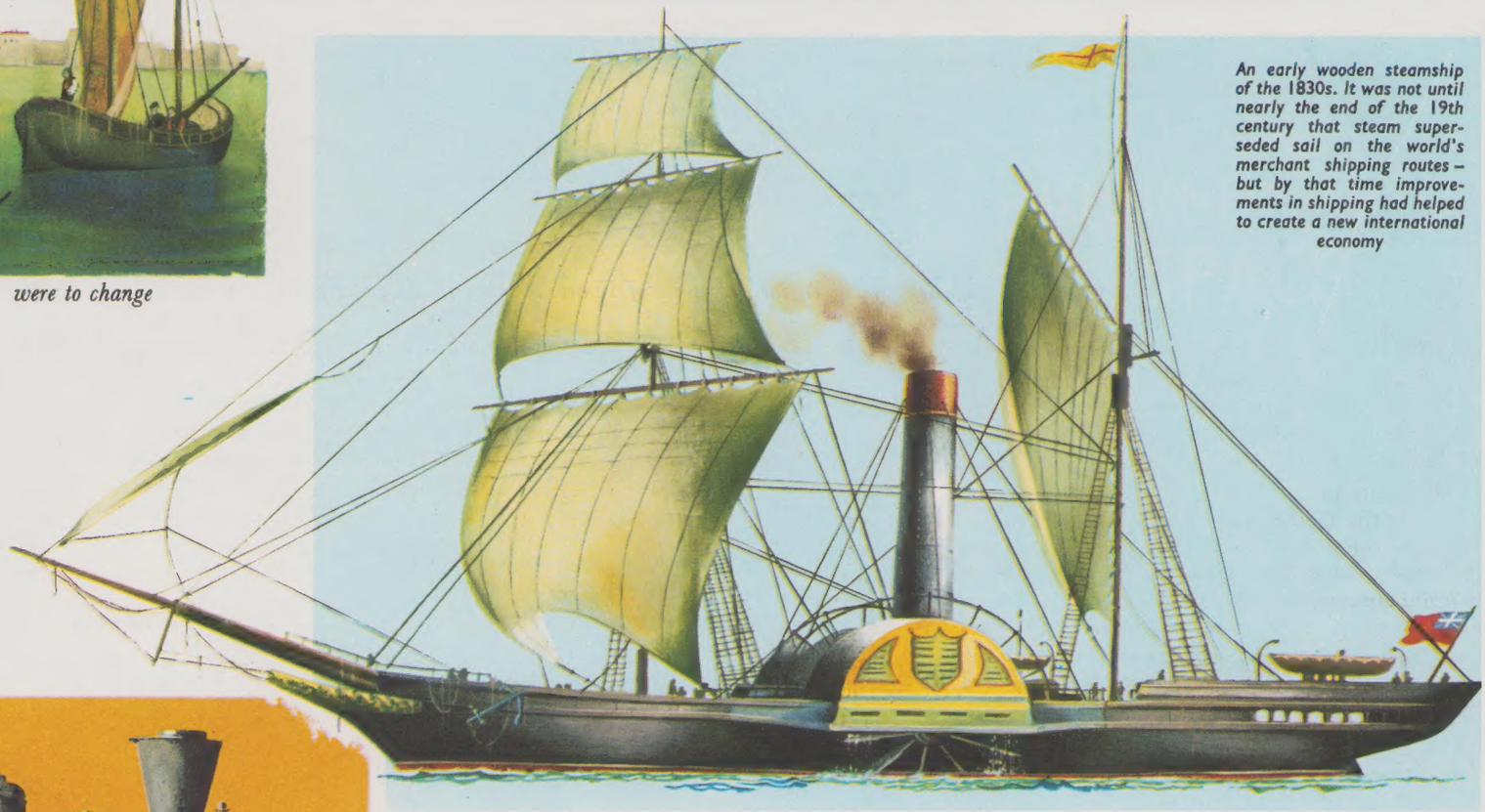
	Sail
1820	2,400,000
1840	2,700,000
1860	4,200,000
1870	4,600,000
1880	3,800,000
1890	2,100,000

PEOPLE EMIGRATING

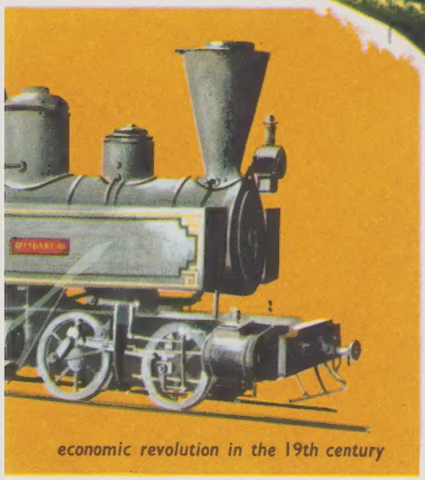
1820–60 5 million

THE 19th CENTURY

were to change



An early wooden steamship of the 1830s. It was not until nearly the end of the 19th century that steam superseded sail on the world's merchant shipping routes – but by that time improvements in shipping had helped to create a new international economy



economic revolution in the 19th century

were already steamboats on the Mississippi carrying cotton to New Orleans, and in 1830 the first iron sailing ship, the *Ironside*, was launched in England. But it was only after 1840, when the Cunard Company opened the first regular transatlantic steamship service (with wooden ships), that the European export of emigrants and import of the produce of the newly opened lands really got under way. By the end of the First World War new, and far shorter, trade routes had been opened up by the Suez and Panama canals; and from the 1890s large, sombre oil tankers took Russian oil through Suez to the Far East.

The sailing ship was doomed; yet it played a major role during the 19th century, and only succumbed to steam in the closing decades. Until mid-century the beautiful American sailing clippers dominated the Atlantic trade, and even in 1880 far more goods were carried by sailing ships than by steamers.

But during the last years of the century great improvements in marine engines enabled fuel for steamships to be used far more economically. And so, by the start of the 20th century, the steamships had invaded even that last stronghold of sail – the long-distance oceanic voyage.

SHIPPING (TONNAGE)

Steam	*Total*
3,000	2,403,000
88,000	2,788,000
454,000	4,654,000
1,100,000	5,700,000
2,700,000	6,500,000
7,200,000	9,300,000

TO THE USA

1860–1910 24 million

THE SPREAD OF RAILWAYS

1825 Stockton to Darlington line – first in Britain.

1830 The first railway in the United States, from Baltimore to Ohio.

1832 The first steam locomotive to run in France, from Lyons to Etienne.

1835 The first German railway – in Bavaria.

1836 Brussels–Antwerp line in Belgium.

1838 First Russian railway ran from St Petersburg (Leningrad) to Tsarskoie Selo.

1854 First Indian railway.

1855 First Australian railway.

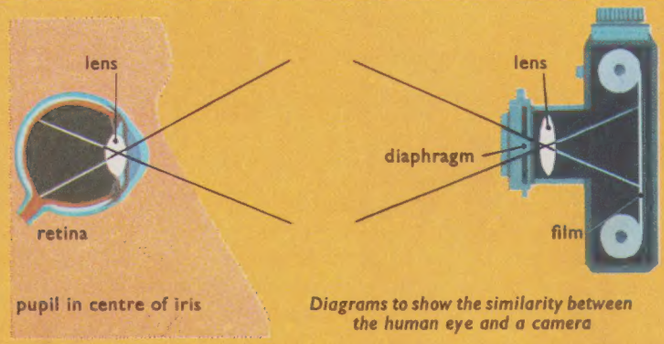
1857 First Argentinian railway.

1872 First railway in Japan, from Tokyo to Yokohama.

THE PHYSIOLOGY OF VISION

HOW keen is your eyesight? Can you, for example, see the full stops on this page from a distance of 5 feet? At that distance each full stop *subtends* to the eyes an angle of $\frac{1}{60}$ of a degree, or 1 minute, and this is the usual limit of visual *acuity* of a human eye. An object which subtends an angle of 1 degree or more can be seen, but one which subtends a smaller angle is usually too small or too distant to be discerned.

In measuring visual acuity as an angle account is taken both of the size and the range of any viewed object. Thus a full stop at 5 feet subtends the same angle as a full stop one-fifth the size at 1 foot, or a black spot 100 times as great at 500 feet. And all are equally just visible.

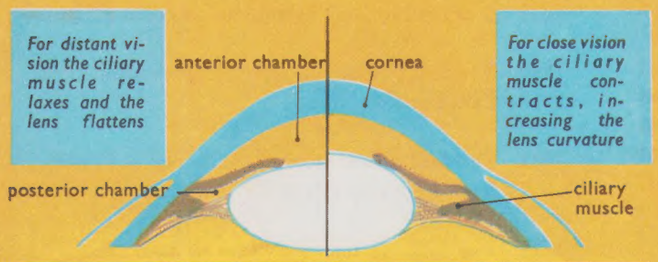


Diagrams to show the similarity between the human eye and a camera

THE EYE AND THE CAMERA

Few objects look more dissimilar than a camera and an eye, though, strangely enough, they have a great deal in common. Each has a *lens* at the front, and in each it is the purpose of this lens to throw a sharp image of any viewed object on to a light-sensitive material at the back. In the camera this light-sensitive material is the film; in the eye it is the very special tissue called the *retina* (see page 242).

A further similarity between the camera and the eye is the *diaphragm* which opens and closes to control the amount of light admitted to the interior. A diaphragm of metal is used in the camera; in the eye it is the *iris* which serves this purpose.


For distant vision the ciliary muscle relaxes and the lens flattens
anterior chamber
cornea
For close vision the ciliary muscle contracts, increasing the lens curvature
posterior chamber
ciliary muscle

Contraction of the ciliary muscle alters the convexity of the lens and thus adjusts the eye for clear vision at all distances

FOCUSING THE EYE

The lens of a camera is made of glass and so its shape and its focal length are fixed. To obtain a sharp image on the film it is necessary to adjust the distance between it and the lens. But in the eye the lens is soft and its shape can be altered by the action of the *ciliary muscle*. Alterations in shape change the focal length of the lens, and it is in this way that a sharp image is always projected on to the retina.

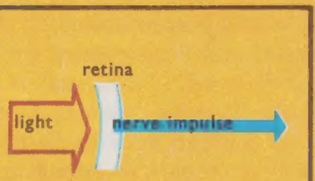
Adjustments in the focal length of the eye are needed when the gaze is moved from a distant object to a near one, or, of course, *vice versa*. They take place without conscious effort and are referred to as *accommodation* (see page 833).

THE RETINA

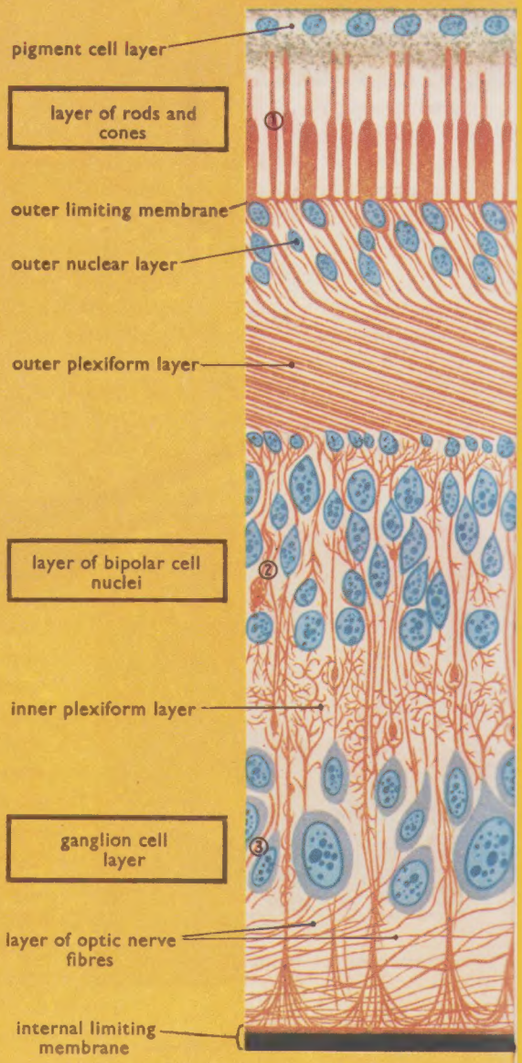
The light-sensitive retina covers almost the whole of the interior of the eyeball. It has an extremely complicated and intricate structure comprising no less than ten different layers of cells and nerve fibres.

The most interesting of these ten layers is that formed by the *rod cells* and *cone cells*. These are the light-sensitive elements of the retina which convert light rays into nerve impulses.

One rather surprising feature of the retina is that the layer of rod cells and cone cells is on the outer rather than the inner retinal surface. In consequence the light rays which are projected by the lens to form the image have to penetrate almost the whole thickness of the retina before they reach the layer of light-sensitive cells. As, however, the retina is transparent, the image is not spoilt.



The retina converts light into nerve impulses



A semi-diagrammatic section through a human retina nuclei are blue, cell cytoplasm and fibres

THE OPTIC NERVE

The retina is served by the optic nerve. This large nerve enters the eyeball at the back just a little to the inner side of the centre line, and, reaching the inner surface of the retina, spreads out to cover the whole of the retinal surface. Clearly, where the nerve passes through the retinal substance there can be no rods or cones, and so this part of the retina is insensitive to light. Consequently it is known as the *blind spot*. Although it is well named, it causes no visual difficulties, since the blind spot in each visual field is covered by the retina of the opposite eye.

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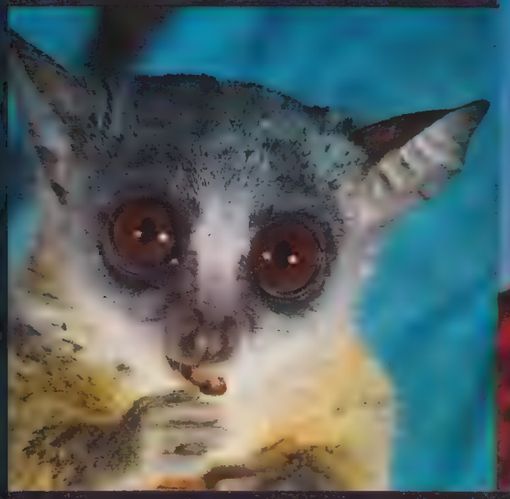
THE CRAZE FOR THE CATAMARAN



My Wild Guests ARMAND DENIS

Nike Zeus at blast-off

He Tried to Steal the Crown Jewels • UFOS—are they watching us or fooling us? • The End of the World • Do Monsters Exist? • Can Science Create Life? • World XI versus Mars

'STRANGE OBJECT IN SKY'
INVESTIGATIONS BY AIR MINISTRY
Flying Objects Near Washington Spotted by Both Pilots and Radar
FLYING DI
FOUND
Taken over by Air Forc
'FLYING SAUCERS' ABLAZE IN SKY'
Inquiry ordered

UFOs

Are they watching us —or fooling us?

IN 1947 most Americans thought that the reports of UFOs (unidentified flying objects) were either the result of hoaxes or illusions. In 1950, according to one of the most reliable American public opinion polls, there had been a mass change of view. In this, the Third Year of the Disc, as it is sometimes called, three out of four Americans were convinced that curious and as yet unexplained objects were whizzing about their skies. Opinions varied as to what these objects were: secret weapons; 'something from Russia'; a new type of 'plane, were some of the views expressed. One in 20 thought that they came 'from another planet or star'.

Why was there this change of opinion between 1947 and 1950? The reason was quite simply that from 1947 onwards there had been many reports, often from reliable and intelligent sources and sometimes backed up by radar evidence, that unidentified flying objects were at large. So many of these reports came in that, as early as the end of 1947, the American Air Force decided to set up a bureau to examine all this information. It was known as Project Saucer.

The reports that came in were often quite similar. The objects were frequently said to be saucer-shaped or cigar-shaped; the former description gave rise to the expression 'flying saucers'. They sometimes revolved and emitted an unearthly glow. They were capable of fantastic speeds and acceleration. They could also remain quite still. Sizes of up to 500 yards in diameter were reported. Their intentions were thought not to be hostile. The objects were inquisitive but did not want to have too much to do with the inhabitants of the Earth, and were said to make off when pursued.

This then was the general picture of UFOs built up in the public mind. There were photographs to support it—but no-one had yet caught one.

One sensational attempt to catch up with an UFO ended in disaster. The incident occurred on 7th January 1948, near Fort Knox in the United States. The Air Force statement reported that Captain Thomas Mantell, 25 years old, 'lost consciousness through lack of oxygen and crashed while attempting to intercept at high altitude an unidentifiable aerial object'. At about 2.45 pm Captain Mantell reported sighting an unidentified object 'directly ahead and above and moving about half my speed'. He said 'it appears metallic, and of tremendous size—it appears like the reflection of sunlight on an aeroplane canopy'. A few moments later Captain Mantell reported that the object was moving about his own speed —around 360 miles an hour—and that it was bright and climbing away from him. At 15,000 feet Captain Mantell said he was going up to 20,000 feet and if he failed to close in on the object he would abandon the chase. This was his last message.

Hot air?

The American Air Force refused to countenance the idea that Mantell had pursued an object manned by any being from another planet, or indeed a secret weapon—and so did most responsible scientific opinion. But reports of UFOs continued to pour in from all over the world.

Many explanations for the rash of sightings were put forward. One of the simplest was weather balloons, including the 'sky-hooks'—balloons which really did look like and behave like 'flying saucers'. It was pointed out that although mysterious objects might appear on radar, radar can play curious tricks. Quite a convincing explanation was that light rays can be reflected downwards by layers of warm air—and if these layers of air moved across the sky they could give the impression of a moving light. These layers of air could also be picked up by radar. This might explain why so many UFO reports came in hot weather. The American Air Force maintained that their pilots could easily be mistaken about heights and speeds of the objects they reported. They could be as much as 20,000 feet or a 1000 mph out in their estimates. Many other reasons were put forward to explain the sightings of UFOs: mirages, meteorites, and so on. The great psychologist Dr Carl Jung even maintained that the sighting of saucers was a psychological symptom of the times that we live in, and that people who saw a circle in the sky were seeing a vision of eternity.

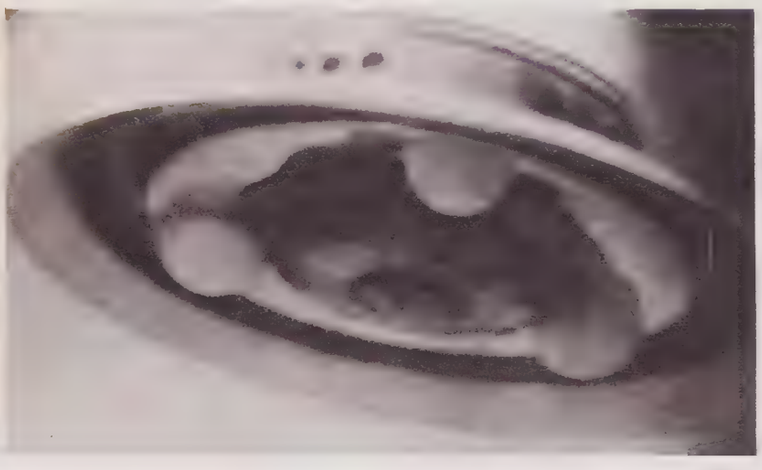
But despite the cold water thrown on UFOs by scientists and psychologists alike, there were many who claimed even to have met their occupants. George Adamski said that he had been up in a spaceship and met Martians, Saturnians, and Venusians. He has written several books in which he tells what a delightful people the race of spacemen are—much more beautiful, charming, and wise than Earthmen. In the course of banquets aboard spaceships, accompanied by fruit juice and fantastic music, he learned how worried the men of space were about the behaviour of Earthmen: about their aggressiveness and the fact that they now had weapons of colossal destruction. Why, the spacemen wondered, could the people of Earth not live in peace with each other?

Even more fantastic than Adamski's story was the suggestion that the people of UFOs were human beings from the future who had found a fourth dimension and were going back in time.

The latest discovery that is attracting attention in the UFO world is that of Global Orthoteny—that UFOs appear on certain lines which can be traced right around the globe. A recent appearance in Vauriat, a tiny French village, where 'a veritable ballet dance of strange craft' took place, was right on one of these lines.

Keep an open mind

So what are we to make of all this? Reports of sightings and new theories will continue until a satisfactory scientific explanation has been given for these sightings. It is certain that many of them can be put down to natural phenomena, optical illusions, or plain mistakes—but there is certainly a small but significant proportion of sightings which has still to be explained. It would be unscientific to say categorically that flying saucers were not the result of a yet undiscovered atmospheric phenomenon or were not manned by men from outer space. We know little about the atmosphere, and our knowledge of the Universe is minute. The best conclusion is in the words of Hamlet: 'There are more things in heaven and earth, Horatio, than are dreamt of in your philosophy.'



It was in a craft like this that George Adamski (the photographer) claimed to have travelled in space

Another Adamski snap — 'a Venusian flying saucer hovering over Palomar Gardens, California'

Photos by courtesy of Flying Saucer Review

DO MONSTERS EXIST?

The mighty Reptilicus is only a creation of the film world—but there may be even stranger monsters beneath the seas
Photo — American International

BY
Michael Tweedie FZS
Consulting Editor of ***Animals***

ALMOST CERTAINLY there exist in the depths of the sea, and possibly in the surface waters as well, large, or even gigantic creatures of which we have little knowledge or none at all.

The depths of the ocean are, of course, extremely difficult to explore —the great 'deep' of the Pacific plunges to over 35,000 feet. The only large abyssal animals we know anything about are the giant squids, and even of these our knowledge is very scanty. A few specimens have been washed up on the shore, and the largest of these measure about 60 feet long, including the tentacles. Sperm whales dive down to attack and eat these great molluscs, and fragments from their stomachs suggest that there are squids far larger than any that have ever been measured. An eye-witness's account of a living squid, reported as being somewhere near 200 feet long, has recently been published (*Animals*, November 19th, 1963), and quite possibly there are squids too large or swift or formidable for even a sperm whale to tackle; we simply do not know.

There are other indications of monsters in the deeps. The common eel goes through a stage of development called the leptocephalus larvae, at which it is 2½ to 3 inches long. Some leptocephalus larva that were 6 feet long were captured in a deep-sea trawl! *If they bear the same proportion to the adult as the larvae of the common eel do, they are likely to grow into eels of 40 feet or more, larger than any python or anaconda.*

Sea serpents?

Even the surface waters may still have surprises for us. It is customary to laugh at stories of 'sea serpents', but some of these cannot be dismissed as a joke. In 1905 two professional zoologists saw from a yacht off the coast of Brazil a large animal with a snake-like head and neck about the thickness of a man's body. It had a 6-foot long dorsal fin showing above the water. Half a century earlier in 1848 the captain and officers of the British corvette *Daedalus* reported a similar creature between the Cape of Good Hope and St Helena. Both accounts suggest that the animal was not a 'serpent', as there was no undulating or wavy motion in its swimming. Moreover the observers on the yacht saw signs of a bulky body under the water. This description would suggest an animal like the plesiosaurus, a type of large reptile supposed to have become extinct about 70 million years ago.

Could it have survived this length of time? Another creature on the Earth 70 million years ago has. This was the coelacanth fish discovered for the first time in 1938 near the coast of South Africa, though its domain is in deep waters off Madagascar.

This squid is a foot long—imagine it 200 times this size with eyes larger than footballs. This is a monster we *do* know about

Loch Ness myth?

And so, inevitably, we come to the Loch Ness monster. Most zoologists are sceptical about it for two reasons. First, there can be no such thing as *the* Loch Ness monster: a single individual. Animal species occur in populations consisting of a number of individuals of both sexes. If such a population of large animals lived in a lake like Loch Ness there would be no mystery about them; they would be observed as a matter of course and be well known. Secondly, the geological history of Loch Ness makes it very difficult to believe that any large animal could have gained access to the lake from the sea (and where else could it have come from?).

I firmly believe there are undiscovered monsters in the oceans, but not in the Scottish lakes.

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THE CRAZE FOR THE CATAMARAN

A large catamaran off Waikiki—it can carry up to 80 people and reach a speed of 25 knots

Photo — Coleman and Hayward

Once the 'cattumaram'—the fantastic craft from the Far East

THE SIGHT of a white sail flashing across the water at a surprising, almost unbelievable, speed is becoming more and more familiar along the British coasts. For the catamaran, fast, compact, cheap, and (with careful handling) safe, is 'catching' on all over the country—indeed all over the world. And because the smaller catamarans can be lifted bodily and carried on the roof of a car, the catamaran has brought sailing within the reach of those who live far from large lakes or the open sea.

Catamarans are exciting. They can travel at 20 knots—about three times as fast as the ordinary dinghy. Their twin hulls give them buoyancy and stability, and they can be taken out in weathers which would keep other small craft safely moored in harbour. In addition, when yachts and dinghys are virtually motionless, a slight breeze is enough to send a catamaran tearing along with tremendous acceleration, for it has practically no displacement and scuds across the surface as if on roller skates. And catamarans need none of the acrobatics on the part of the crew which are necessary to keep a dinghy upright on choppy seas and in high winds. One of the few disadvantages of catamarans is spray. The crew sit above the floats in an unprotected position and, though the hulls usually have spray deflectors, they are vulnerable to spray coming between the floats as well as over the top.

Revolutionary Construction

But all in all it is hardly surprising that there is today a craze for the catamaran, particularly along the south coast in resorts like Weymouth, Bognor, and Hayling Island; and special catamaran clubs are springing up all over Britain.

All this has happened in the space of a few years, for until 1956 there was little enthusiasm for catamarans. Although in origin catamarans go back to the most primitive craft of the Far East (the name comes from the Indian *Cattumaram* which means 'tied logs') it was only during and after the Second World War that developments took place which were to lead to the catamaran's present popularity. These developments were associated with new glues which enabled thin sheets of plywood to be connected to give astonishing strength combined with lightness. Frances and Roland Prout, the pioneers of the modern catamaran, made their first 'cat' in 1947 from two canoes joined together by planks. And in 1956, with specially designed 18 foot hulls and a sail area of 170 square feet, they produced *Shearwater III*. In the first 12 months 250 were sold. The catamaran had arrived and has never looked back.

Catamarans can be used for cruising about on inland lakes with shortened sails or perhaps an outboard motor; they can be used for bracing runs on the open sea; they can, of course, be used for racing; and many adventurous long-distance voyages across the Atlantic, the Pacific, or into the Arctic regions have been made in catamarans.

Britain leads

In fact its versatility is perhaps the most amazing thing about the 'cat'. You can buy one with 16 foot hulls for perhaps £250. One millionaire has a catamaran with 100 foot hulls —about 40 feet is a common length for a long voyage.

The great event in the catamaran world is the annual contest for the International Challenge Trophy. There have been three competitions and Britain has won all of them.

WOULD YOU PICK THIS TEAM TO PLAY MARS?

FIRST PRIZE-£10

Goal: *L. Yashin* (USSR)
R.B: *D. Santos* (Brazil)
L.B: *K. Schnellinger* (W. Germ.)
R.H: *S. Pluskal* (Czech.)
C.H: *J. Pophular* (Czech.)
L.H: *J. Masopust* (Czech.)
O.R: *N. Garrincha* (Brazil)
I.R: *J. Greaves* (England)
C.F: *D. Law* (Scotland)
I.L: *E. Pele* (Brazil)
O.L: *F. Gento* (Spain)

Paul Burchett, (14) 213, Purfleet Road, Aveley, Essex.

THE response to the 'World versus Mars Competition', set in Knowledge, was overwhelming. We asked you to pick a team from all the players in the world today to play against an imaginary side from Mars.

Certain selections were almost automatic. Yashin was easily the most popular goal-keeper while Masopust and Pele found their way into a very large majority of teams. A little disappointing was the regularity with which the name di Stefano appeared at centre forward. Great as he is, it is quite probable that alongside such fast, dynamic forwards, as say Pele, Garrincha, or Eusebio his relative slowness might reduce their own effectiveness. A number of you found an imaginative solution by playing Denis Law in the No. 9 jersey; admittedly he does not play centre forward —but then, at one time or another during a match, he seems to play in every position on the field. The positions which gave the most trouble were apparently centre half and full back. The two Santos' from Brazil, Schnellinger of West Germany, and Jimmy Armfield of England were the most popular full back choices, although at least a dozen others were named. With those who did not choose an all Czech half back line, Norman of England, Ure of Scotland, Maldini of Italy, Hurley of Eire, Santamaria of Spain, and Netto of Russia were consistent choices.

Second Prize Winners of £5

R. B. Payne (15)
21, Arlington Ave.,
Leamington Spa,
Warwickshire.

Michael Brown, Anthony Swinnerton, David Baker, Eric Clark, and John Slater
Holyhead Road C.P. Junior School,
Wednesbury, Staffordshire

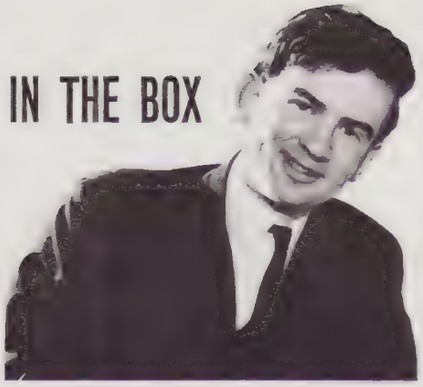
Third Prize Winners of £2

David J. Clarke (16)
79, Burnside Grove,
Tollerton, Nottinghamshire.

S. J. Daniels
47, Vicarage Road,
Ware, Hertfordshire.

Miss Susan Webber (12)
Pennywell,
Landscove,
Nr. Newton Abbot,
South Devon.

IN THE BOX



The Editor talks to HENRY VIII

Tune in to FWHTV (Far & Wide Historical Television) and hear your Editor put to Henry VIII the questions you've always wanted to ask

EDITOR: *Your Majesty, I would like to start with a question that I am sure all our audience want me to ask you. You had six wives, and executed two of them. Don't you think that this was going a bit too far?*

HENRY VIII: **Well let's start with Anne Boleyn—I think a lot of people have misunderstood my relationship with her.**

EDITOR: *What was your relationship?*

HENRY VIII: **I loved her. And as an unmarried man I was perfectly entitled to fall in love.**

EDITOR: *But surely you were married, to Katherine of Aragon, in* 1509, *the year of your accession.*

HENRY VIII: **That marriage was invalid. Katherine was my brother's widow. As our children died at birth one after another I knew my marriage was, in Heaven's eyes, cursed.**

EDITOR: *But you had a child, Mary.*

HENRY VIII: **Could I think of that as anything but a curse? After all, the 15th century had been one long struggle for power. A woman on the throne would have invited faction and perhaps the downfall of the Tudors. No, I needed a son and England needed a king.**

EDITOR: *Is that why you married again?*

HENRY VIII: **I suppose if I am honest I must say that is why I married Anne Boleyn. Unfortunately her child also turned out to be a girl, Elizabeth.**

Editor: *What were your feelings towards Katherine?*

HENRY VIII: **You must understand that compassion had no part in my makeup. No true king can afford the luxury of sentiment. Katherine stood in my way and I was furious with her for doing so. But more than that she was also religiously wrong for I was not her lawful husband. She should have acknowledged that and made the best of it.**

EDITOR: *Is it true that you broke with the Roman Catholic Church because you wanted to marry Anne Boleyn?*

HENRY VIII: **I don't like the word 'Roman Catholic'. Catholic means 'universal'. The Roman Church is part of the Catholic Church, just as the English Church is. And it was the Romans who split from the English; after all, they excommunicated me, not I them.**

EDITOR: *Did excommunication worry you?*

HENRY VIII: **As I was Supreme Head of the Church in England you can hardly expect me to have been particularly worried from a personal point of view. However, I must confess I was worried lest France and Spain should take orders from the Pope and attempt to depose me.**

EDITOR: *Weren't you then risking the safety of the kingdom simply in order to remarry?*

HENRY VIII: **I have already pointed out that not to remarry and not to have an heir would have imperilled the kingdom. And surely the future answers the rest. Only an England independent of Rome could be both free and great. You must remember that the Pope granted virtual independence to the French Church in 1516. If it hadn't been for the fact that the Pope was in the pocket of the Emperor and I was 'divorcing' the Emperor's aunt, I have no doubt at all that my action would have received the blessing of Rome.**

EDITOR: *The real point of controversy, however, was not so much the divorce. After all, Thomas More accepted that. What was revolutionary was your title Supreme Head of the Church.*

HENRY VIII: **The Pope had been steadily encroaching on the king's authority over the Church since the reign of John and the papacy of Innocent III. My action** *appeared* **revolutionary but, in fact, I was simply putting the clock back.**

EDITOR: *That is your interpretation, but surely the Roman claim to rule the English Church goes back at least to the Synod of Whitby in* 664.

HENRY VIII: **Considering that there was not even a King of England in 664 his relationship to the See of Rome must remain a matter for speculation don't you think?**

EDITOR: *Some people have considered that you were guilty of a breach of good faith in January* 1533 *when you appointed Thomas Cranmer to be Archbishop of Canterbury. After all, his consecration from Rome required from him the most solemn vows to uphold the authority of Rome. And you obviously knew that he would very shortly defy the Pope by legalising your marriage to Anne Boleyn?*

HENRY VIII: **I consider that an impertinent question and I don't propose to answer it.**

EDITOR: *I see the years have not dulled Your Majesty's famous temper. But tell me, did you realise the full significance of the break with Rome?*

HENRY VIII: **Of course I didn't. You must remember that I died before the Council of Trent declared categorically in favour of Papal supremacy. It was at least possible that Trent would have limited the authority of the Pope and placed supremacy in the hands of individual bishops under a General Council of the Church.**

EDITOR: *Were you yourself a Protestant?*

HENRY VIII: **Categorically no. I was a Catholic. I believed in the sacraments, in grace, in the priesthood, and in the hierarchy. My Six Articles, published in 1539, were extremely Catholic. It is unfortunate that the English Church is called Protestant, as is Calvinism. The two had, and indeed have, little in common. Mine was a political not a doctrinal reformation.**

EDITOR: *A criticism that has often been levelled is that you made a lot of money out of confiscating Church lands.*

HENRY VIII: **So I did, but I was only doing something which had been mooted for years. Cardinal Wolsey himself dissolved a few monasteries, you know.**

EDITOR: *You were much more extravagant as a monarch than your father, and in* 1544 *you seriously debased the coinage. Why was your reign so much more insolvent than your father's?*

HENRY VIII: **It was an age of rising prices. As a landowner I suppose you could say I was on a fixed income and therefore suffered from the price rise. And my father lived at peace. I fought wars.**

EDITOR: *A short while ago you mentioned Wolsey. Did you ever seriously think that he would get you elected Holy Roman Emperor in* 1519*?*

HENRY VIII: **I suppose in retrospect, no. But he talked so big you know, and was quite confident he would one day be Pope. I was young and liked to think that English influence might dominate the continent, as it would have done with an English Pope and an English Emperor.**

EDITOR: *When Wolsey failed to make the Pope grant you your divorce you sacked him as Chancellor in* 1529. *Similarly you executed your next Chancellor, Thomas More, in* 1535, *and executed your secretary of the Privy Council, Thomas Cromwell, in* 1540. *All this as well as the wives you dispensed with. Were you as ruthless as this record suggests?*

HENRY VIII: **Well, I never really liked Wolsey, or Cromwell for that matter, though when More went I lost my greatest friend. As for my wives, there were individual reasons for all my actions, and a king who lets his heart rule his head is no benefit to his country.**

EDITOR: *A personal question, Your Majesty, what was the happiest moment of your life?*

HENRY VIII: **When my dear wife, Jane Seymour, bore me a son, Edward.**

EDITOR: *And your most disquieting?*

HENRY VIII: **When I saw Anne of Cleves. Cromwell's picture of her was most misleading, most misleading.**

EDITOR: *And when you died did you expect to go straight to Heaven?*

HENRY VIII: **Frankly no. And I didn't expect to find the Pope there either. Certainly I anticipated punishment for my sins, but no more so than the average man.**

EDITOR: *Well, Your Majesty, in conclusion I would like to ask whether, if you had your life over again, you would have acted differently. For example, would you have still put Cranmer in the Council you left to Edward, and ignored Gardiner which definitely meant a swing to Protestantism?*

HENRY VIII: **Yes I would have made changes, though I think Cranmer's Protestantism had a lot to do with English independence and greatness under my splendid daughter, Elizabeth.**

EDITOR: *What changes then?*

HENRY VIII: **I would never have given Parliament the big ideas it got between 1529 to 1536. I believe the monarch should rule his country, yet Parliament, because of all the help it gave me got a swelled head.**

EDITOR: *Thank you, Your Majesty.*

FACE to FACE Competition

Imagine you are interviewing any figure from history. Here is what you must do.

1. **Think of three questions you would like to ask any man or woman who is dead. Then write them down together with their replies. Each reply must be no longer than 50 words.**
2. **The winning entry will be the most interesting set of questions and answers.**
3. **The competition will be divided into two parts—for British and Irish entries and for Overseas entries.**
4. **There will be two first prizes of £5, four second prizes of £2 and eight third prizes of £1.**
5. **Closing date for British and Irish entries will be Feb. 1st, 1964 and for Overseas entries May 1st, 1964.**
6. **The best entries will be published in Far & Wide.**
7. **Send your entries to 'Face to Face Competition', 37 Hertford Street, London, W.1. Put your name, age, and address on your entry.**
8. **There is no age limit—but age will be taken into account when judging.**

THIS IS A FIGHTER PILOT

by
FRANK MASON
Editor of
'Flying Review
International'
and once a
fighter pilot himself

OTHER BRITISH FIGHTERS TODAY

The Lightning *The fastest fighter in the Royal Air Force with a speed of Mach 2.*

Hawker Hunter *Ground attack and fighter reconnaissance aircraft.*

The Hawker P1127 *Experimental vertical take-off aircraft—speed secret.*

The Buccaneer *The Navy's low level strike aircraft, flies low enough to escape radar detection. Can operate from the Royal Navy's shore bases as well as carriers.*

This could be 30 minutes in the life of two men and a Javelin

'CORNCRAKE BLUE ONE, scramble. Make angels forty-five on vector oh nine oh. Your target X-Ray four oh five. Call Chinstrap on T-Tare.' Leaning forward Tony lifts a small white lever and stabs a striped button. A hum breaks in on his earphones and the rev counters spin round as the port engine starts up. The starboard engine follows as Peter, the navigator, in his cockpit 6 feet farther aft, begins his hundred and one checks for take-off—take-off which will send the 15-ton Javelin all-weather fighter nearly 4 miles above the earth.

Now the suspense is over. Suddenly, the engines start with a thunderous roar, the chocks are snatched away from the wheels and the great drab dart-shaped fighter moves forward on to the runway, pulling out as it does so the telephone line that has been plugged into the tail and through which have passed the orders for the pilot to take off.

The rain is sheeting down, blurring the windscreen so that Tony is scarcely able to see the white ribbon of shining tarmac ahead; the engine noise doubles; great twin sheets of flame spurt from the tail. The nose lifts and half way down the runway 'Blue One', blasting a final cloud of spray, arches off the ground and traces a smooth but powerful curve up to those ragged driving clouds above.

In his cockpit Tony can hear very little engine noise. As he feels the vibration of his wheels die away he leans forward and punches a button to raise his undercarriage. Pressing another switch he calls the radar station which has ordered him to take off: 'Hello, Chinstrap, this is Corncrake Blue One on oh nine oh, making angels forty-five.'

This is the language of the pilot in the air. In two and a half minutes Tony has obeyed orders to start up, take off, climb in a certain direction to 45,000 feet, and to contact the radar station to receive further orders to help him find and intercept an approaching target.

Now the Javelin is enshrouded by a white fog as it thrusts upwards through the rain clouds. Tony concentrates on his instruments, for without seeing the ground or the horizon he must rely on these completely. And his navigator has switched on his radar, the big scanner of which is nodding back and forth in the nose, seeking out any other aircraft in their path.

Explosion of light

Suddenly there is an explosion of light in the cockpit as the fighter bursts through the top of the clouds, and Tony jerks his eyes up to take a look around the new world that meets him. A few seconds to become accustomed to the glare and already the clouds are several thousand feet below; above is a great dome of unbroken blue sky.

They have been aloft a bare eight minutes. The navigator makes a quick calculation and tells his pilot that in 90 seconds their radar should 'see' their quarry. Tony's reaction is swift. He turns switches and presses buttons to make ready the four big missiles which are attached to the wings, so that if the need arises he has only to squeeze the trigger on the stick to send one, two, or four blasting off towards the unknown target.

The blue above has turned much deeper as the Javelin levels out at 45,000 feet, for in the upper atmosphere above the earth the lack of tiny dust particles deprives the sunlight of reflecting surfaces; and in this apparent twilight the visibility is poor so that once again Tony's eyes return to his instruments. Orders are now coming fast over the headphones . . . 'Corncrake Blue One, your target now 36 miles, turn port 20 degrees . . . your target now at one o'clock . . .'

Mentally Tony pictures the unknown target approaching him at a relative speed of nearly 1000 m.p.h. Suddenly Peter's voice breaks in over the radio, 'Contact',—the Javelin's radar has spotted the target. Now the ground controller's commentary is replaced by Peter's urgent orders: 'port five . . . steady . . . go down 100 feet . . . hold that rate . . .' Tony glances up and starts to scan the great void ahead. Suddenly he spots it, a silver-white shape passing a few miles ahead and slightly above. Just a moment's pause and then . . .'O.K. Peter, I see it; it's a Vulcan.'

'Bonds of earth'

Switching his missiles to *Safe*, Tony draws the Javelin round, following the great white bomber in a curving pursuit. Reading off the identity letters, Tony calls the radar station: 'Chinstrap, this is Corncrake Blue One, Tallyho, one Vulcan at angels forty-five steering 270.'

'Roger, thank you, Corncrake Blue One; you may return to base.' The chase is over. Within minutes Tony is approaching the airfield. He receives a series of quick-fire orders from the ground: 'Left a degree, now steady . . . you're in the glidepath . . . right 2 degrees . . . check undercarriage down . . . reduce rate of descent . . . runway half a mile . . . steady. Look ahead and land visually.' Snapping his eyes ahead, Tony sees in the murk of driving rain the shiny strip of runway with the brilliant yellow sodium lights stretching away into obscurity. Easing back on the stick, he settles the big machine on to the ground—after barely 30 thrilling minutes in the air. Is it surprising a pilot, just such as Tony, once wrote these words?

'Oh! I have slipped the surly bonds of earth
And danced the skies on laughter-silvered wings;
Sunward I've climbed, and joined the tumbling mirth
Of sun-split clouds—and done a hundred things
You have not dreamt of—wheeled and soared and swung
High in the sunlit silence . . .'

MY WILD GUESTS

Armand Denis

tells you about a few of the animals which have been part of his household, and advises you to think twice before extending your hospitality to some of them.

It is hard to believe that these adorable little cheetahs with Armand and Michaela can grow into wilful and temperamental household residents

I HAVE, AND HAVE HAD, a great number of animal pets, and many of them are by no means animals you would expect to find in your local pet shop! Those of you who watch my 'On Safari' programmes on television will know all about Gilbert my baboon, and Minnie the mongoose. My life has largely been spent with animals, so it is natural that I should often have made 'friends' with them. Of course, I am lucky. Because I live in Africa I have endless opportunities, not only to see rare and interesting animals, but also to take them into my Nairobi home and to make household pets of them. Once my wife, Michaela, and I discovered that fascinating animal the aardvark burrowing not far from our home. We took this rare creature home to observe its habits at close quarters. At first we were worried because it would not eat anything we put in front of it; then we found that it liked egg beaten up with milk and finely-ground steak—so much so that when we released it, it found its way back again; and it was several days before it could be induced to return to the wild state!

Very much the boss!

One of my most unexpected 'guests' was a secretary bird. It was as I was driving with Michaela in our Landrover that I saw one of these quite rare birds lying helplessly on the ground. Somehow it had contrived to break its leg. We took it home and with the aid of bandages and splints patched up its leg which, to our delight, made an excellent recovery. And also to our delight the bird showed no sign of wishing to leave us, seeming quite content to remain at home. We had tamed it. Now this was very surprising, for the secretary bird is usually an extremely wary and solitary animal. Our success indicates that there are probably very few animals that cannot be domesticated under the right conditions. The secretary bird is a far more imposing creature than its name implies—a name it got, incidentally, from the quill-like feathers sticking out from its head which remind people of 19th-century clerks. We were able to experiment with this large bird (it stands about 4 feet from the ground when fully grown) by holding a mirror in front of it. It took its reflection to be a potential enemy and raised its wings to try to frighten its 'rival' off. Then it jumped clean over the mirror to try to get at the other bird, and with great surprise discovered its enemy had mysteriously flown! In fact, one might call the secretary bird 'very much the boss'.

Few people would consider making pets of lions and tigers but I have known many who have made pets of cheetahs—the fastest of all land animals. Indeed I have kept several cheetahs myself, and have little hesitation in advising you *not* to ask for one on your next birthday. Even if you had the time and space to exercise and look after a cheetah (and they take a lot of time and space) I think you would be very disappointed with the response you got from your efforts. In my opinion, cheetahs are sometimes rather dull animals, and can be unaffectionate. They have an annoying habit of looking straight past you at some object on the horizon known only to themselves, and no amount of coaxing will make them take any notice of you if their minds are elsewhere. And taking them for walks is no joke, for if a cheetah gets it into his head that he does not want to go for a walk he simply takes a few paces and flops down. All the heaving and pulling in the world will not change his determination to stay put, though he will probably continue to purr loudly and affably.

The lemur—a popular primate pet from Madagascar

The unique aardvark—with a liking for egg, milk, and finely ground steak

But the cheetahs' peculiarities can be dangerous as well as irritating. Once, as I was taking two cheetahs from Mombasa to Boston, we made a stop somewhere along the Mozambique coast. I decided to take my cheetahs ashore and the only way was down a rope ladder over the side of the ship. I lifted one of them and made my way warily down the ladder. Suddenly my cheetah caught sight of a bit of paper floating on the water. And the effect of that piece of paper was electric. I suppose it is a long inbred instinct which alerts cheetahs when they see the slightest movement, whether within a few feet or far away in the distance. Sometimes they will

drop intently to the floor and stalk the moving object. But mine lost its head and panicked when it saw that paper, and in the ensuing struggle punctured an artery in my arm with its claw. We reached the ground both covered in my blood and I honestly cannot explain how the episode did not end in tragedy.

My friend Bernhard Grzimek of Frankfurt Zoo, who is an advisory editor of ANIMALS, also had a cheetah, a female, called Dikhill. His was very tame and on occasions he would keep her indoors like a domestic cat. In fact she sometimes used his library in place of a tree trunk to sharpen her claws, which cannot have reassured the rest of his household very much!

There are a surprising number of wild animals which many people, even in Britain, are able to keep as household pets. It is uncommon but by no means unique for British families to have snakes in the basement, or kangaroos in the back garden. Baroness Beck, who lives in Suffolk, has among her pets a wallaby and a sloth bear. Some of the most popular wild animal pets are lemurs and monkeys. The monkeys which make the best pets are capuchins and marmosets from Central and South America, gibbons (which are actually not monkeys but apes) and macaques from Asia, and mangabeys and vervets from Africa.

But though it is exciting, it is not necessary for those in Britain to look to foreign countries if they want to 'adopt' wild animals. There are plenty of British wild animals which can make attractive and unusual pets. I have known people successfully tame badgers and otters, while some have persuaded squirrels to live and play in the trees in their gardens—though these can hardly be considered pets. One creature which does make a very willing pet is the hedgehog. It will quickly become attached to you, and will quite readily come into your home once it has learned it will always find a meal.

If you do decide to try to make a wild animal a pet you must remember that no animal can be returned to the wild state once it has been tamed. If you ever decide to purchase a foreign animal you should make exhaustive enquiries into the food and accommodation it will require, and should certainly verify that the nearest zoo will take the animal if your experiment does not work too well. Finally I would like to emphasise that if you domesticate an animal and make it feel at home it *likes* being part of the household. Anyone can lock up, for example, a fox, and keep it alive by feeding it. This is not making a pet. It is simply depriving a fine animal of its liberty for no sensible reason, that I for one can think of.

A few snuffles from an anteater are recorded for a world-wide audience

Another guest—a half-grown African genet cat

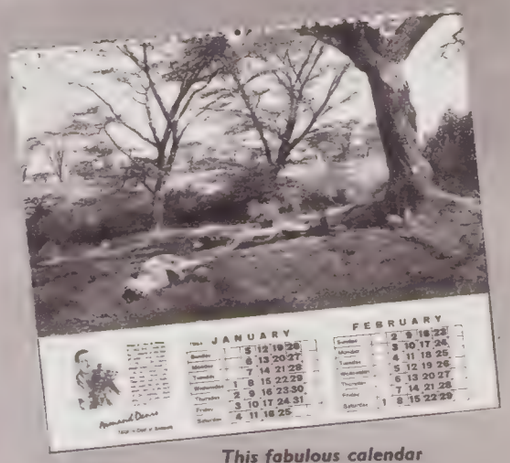
If you want a gorilla..

You must be prepared to pay about £2,000. However, there are a variety of rare and interesting animals which are far less expensive. The following price list is quoted by *Harrods*, the London store which supplies fanciers, dealers, and zoos all over Britain. These prices are invariably for young animals. Before they will supply one of the rarer animals Harrods make enquiries to discover whether a buyer is capable of looking after it. A spokesman said: 'We strongly discourage irresponsible purchases.'

Prices from Harrods

	£		£		£
GORILLA	2,000	WOOLLY MONKEY	60	VERVET	25
CHEETAH	500	CERVAL	60	MACAQUE	25
AARDVARK	300	LEMUR	60	CAPUCHIN MONKEY	25
LAUGHING JACKASS	300	WALLABY	60	BUSHBABY	25
DUCK BILLED PLATYPUS	300	OTTER CUB	50	BADGER CUB	25
		WOMBAT	45	RATTLESNAKE	25
MANDRILL	300	SECRETARY BIRD	45	GIANT TORTOISE	15
CHIMPANZEE	250	ANTEATER	35	COATI MUNDI	12/15/-
KIWI	200	HORNBILL	35	HUMMING BIRD	12
OSTRICH	180	RACCOON	30	SEA HORSE	7/10/-
KANGAROO	150	MANGABEY	30	BIRDEATING SPIDER	6
TIGER CUB	150	FLAMINGO	30	DORMOUSE	5/6/-
CONDOR	150	SPIDER MONKEY	30	FOX	5
WOLF CUB	120	PYTHON	30	CHAMELEON	3/6/-
HYENA	100	POTTO	26	ALLIGATOR	3
LION CUB	90-130	MONGOOSE	25	CAYMAN	2/5/-
BABOON	85	TOUCAN	25	LIZARD	1/10/-
GIBBON	60	COBRA	25	SNAKES (various)	from 10/-

Get this wonderful Animals Calendar for 1964



This fabulous calendar has six full-colour Armand Denis pictures—price 6/11

From all newsagents and booksellers

IN CASE OF DIFFICULTY WRITE TO:
37 Hertford St., London, W.1 (Post free)

THE END OF THE WORLD

IT WAS NEARLY FOUR YEARS AGO that a strange panic affected people in all parts of the world. For they thought that the world was about to end. The focal point of this panic was India, where astrologers learned with horror that by a curious chance all five major planets, Earth, Mars, Jupiter, Venus, and Saturn would soon be in conjunction; that is, form a straight line across the universe. To these astrologers this could mean only one thing—that, when the planets conjoined, the world would end. And in other countries too people made their preparations. Near Mont Blanc a dedicated group waited at the top of a mountain for the appointed hour—1.45 in the afternoon of 14th July 1960. That time came and went, and the astrologers returned to their charts to work out where they had gone wrong.

Compared with other 'end of the world' scares, that of 1960 was mild. From the earliest civilisations, Chinese, Egyptian, and Babylonian, people have anticipated the world's end. This is not surprising, for, after all, everything around us, including our own lives, has a beginning and an end. So why not the world, space, time, and the universe? But the advent of Christianity gave a specific meaning to such ideas; for to Christians the end of the world was prophesied as the Second Coming of Christ.

But when would that Second Coming take place? After the Ascension the Apostles in Jerusalem expected it, literally, any day. And it was several generations before Christians lost their general feeling of expectancy. Yet Christians have never lost sight of the fact that their great task *is* to prepare for the Second Coming.

At times people have thought the end of the world to be imminent because of their interpretation of a passage in the Bible. Others have been convinced by a great natural disaster.

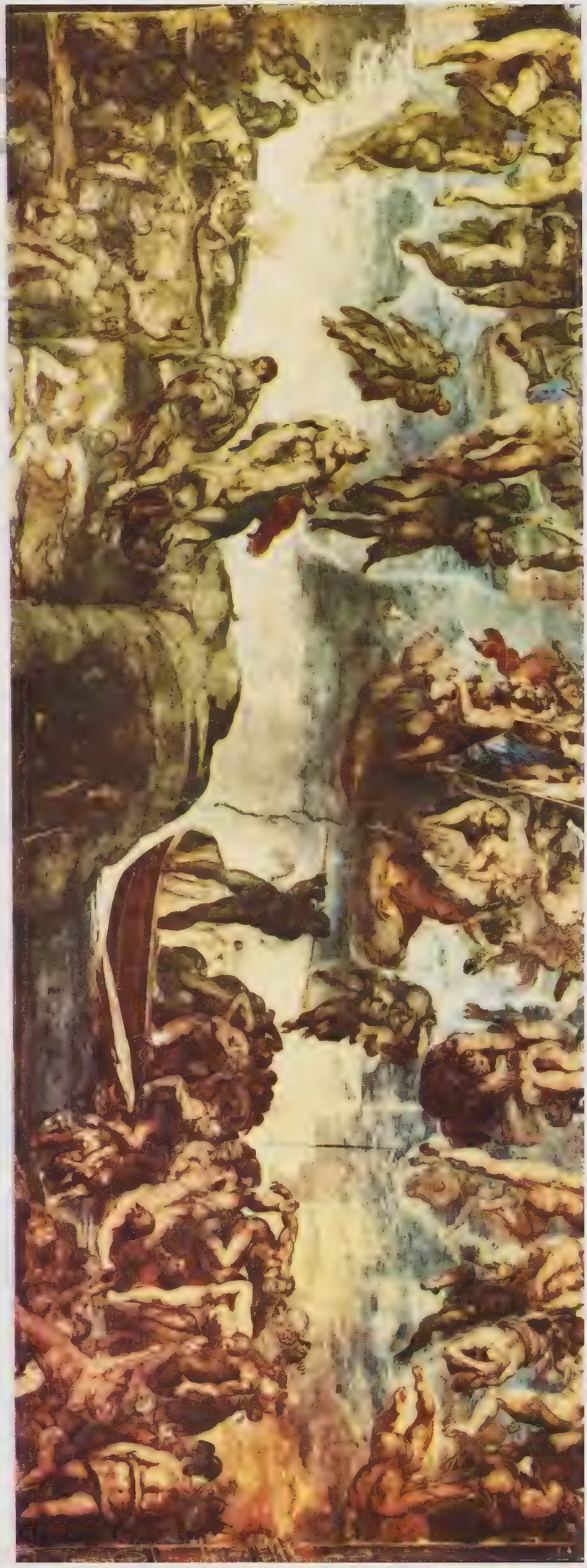
At the approach of the year AD 1000, the end of the first Millennium, there was a general feeling of foreboding and impending doom. In 1348 during the Great Plague, when perhaps half the population of the known world perished, it was natural that the same expectation of world catastrophe prevailed. Indeed outbreaks of plague were often occasions for such scares. In 1532 the Pope excommunicated a comet which was supposed to be the cause of both the plague and a scare that the end was at hand. In 1661 a group of Fifth Monarchists held the City of London for five days 'For King Jesus' and awaited His coming in vain. The great plague of 1665 caused another wave of prophetic gloom.

And today? In our own time there are pamphlets in circulation expressing the same fears as those of 1000, 1348, 1532, 1665, or 1960. Here is a quotation from one of them: 'This appeal could be the last you will receive—we do not know—but we do know that the time is short.' But now the overwhelming majority of the Christians (and others) are concerning themselves with their Godly activities in this world, in preparation for the future of mankind on earth.

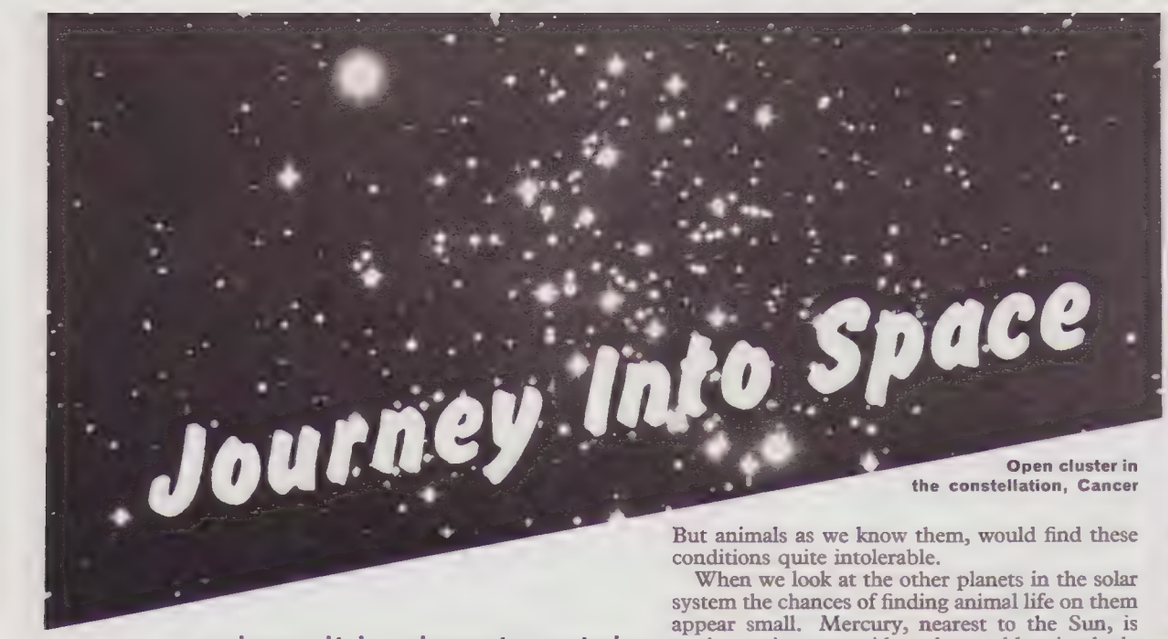
THE LAST JUDGMENT

On the right is how one of the most brilliant artists of all time saw the Second Coming and end of the world. It is the *Last Judgment* painted by Michelangelo (1475-1564) above the altar of the Sistine Chapel, inside the Vatican Palace in Rome, and is perhaps the most famous single painting in the world. Michelangelo began it at the age of 60 and it took him seven years to paint. The picture has a tragic, almost savage intensity about it. Note the angry gesture of Christ, the Judge; the fear even of the chosen (on His right); the despair of the damned (on His left); and the horror of those cast down into Hell. When the picture was completed in 1541, it had a very mixed reception. Some ecclesiastics were horrified by the fact that few of its figures had any clothes on—some even wanted to destroy it completely. A compromise was reached whereby artists were commissioned to paint in draperies to tone down the general impression of nakedness. The reproduction of this picture is taken from *Discovering Art*, the new weekly encyclopaedia of art. A feature on Michelangelo will appear in one of its forthcoming issues.

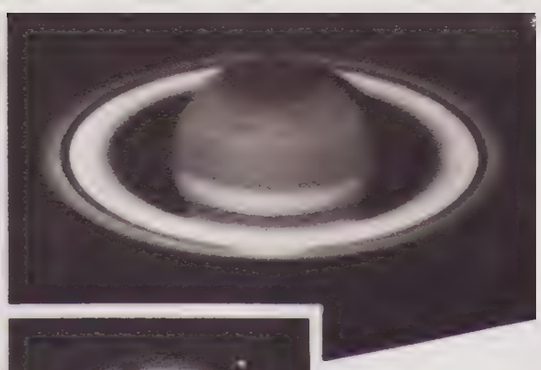
The reproduction of this picture is of such high standard that it is suitable either for framing or display

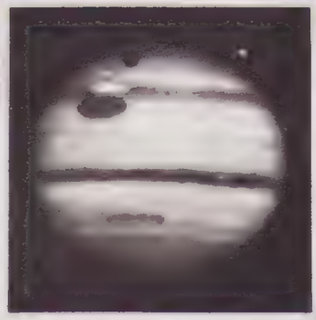


Journey into Space



Open cluster in the constellation, Cancer





Saturn (above) and Jupiter (left)—large, cold, and unfriendly

Mars—Earth's nearest major planetary neighbour which may have some form of vegetable life

Photos by courtesy of the Royal Astronomical Society

—where it is almost certain LIFE EXISTS

WHAT IS MORE, there is the likelihood that it exists no farther away than the planet nearest but one to our own. Mars, at its nearest approach to Earth, is only 35,000,000 miles away and in astronomical terms this is very close indeed.

Mars is half the size of Earth having a diameter of about 4,200 miles. Its surface area is therefore only one-quarter that of Earth's but, as there are no seas on Mars, the land areas of the two planets are very much the same.

The surface of Mars appears remarkably flat. At each pole, however, there are shining, white areas which are almost certainly ice. In the spring and the summer (for though Mars takes 687 days to travel around the Sun there are seasons much as there are on Earth) these white areas recede towards the poles, and belts of dark spread towards the equator. It seems very probable that these dark areas are millions of square miles of vegetation. This vegetation, aided by the water vapour from the melting ice caps, grows, spreads, and dies once in each Martian year—so at least there is vegetable life.

But what of animal life on Mars? Are there any creatures there which resemble the animals found on Earth? The answer to this question is probably 'No'. The sparse atmosphere of Mars may well be suitable for vegetation not unlike some of the simple plants found on Earth, and lichen and fungoid types may grow profusely. But animals as we know them, would find these conditions quite intolerable.

When we look at the other planets in the solar system the chances of finding animal life on them appear small. Mercury, nearest to the Sun, is too hot on its sunny side and too cold on its shady aspect. Venus, between Mercury and Earth and the most brilliant object other than the moon in the night sky, is shrouded in perpetual cloud and surrounded by an atmosphere of carbon dioxide. In orbits farther from the Sun than Earth's, the planets Jupiter, Saturn, Uranus, Neptune, and Pluto circle unpromisingly. Of Pluto almost nothing is known. Of the rest we know that they are huge, cold, and that hydrogen, methane, and ammonia predominate in their atmospheres. If in the Universe we are to find animals like those we know on Earth, we must look and guess much harder and much farther afield.

As far as is known the only bodies in the Universe on which life as we know it is at all possible are planets such as those which encircle our own Sun. In any such system there is always the chance that one planet is just the right size to have an atmosphere, and just the right distance from its sun to have an equable temperature. But the astronomer who turns his telescope away from our neighbouring planets in the solar system to the vast reaches of space sees there little to convince him that anywhere outside the solar system is there a planet such as this. But just because his telescope cannot reveal such a planet, he knows that this is no reason why it should not exist.

Moreover, recent investigation of meteorites has revealed evidence of large organic molecules embedded in their structure. Such molecules are very similar to those found in cells of simple organisms of Earth.

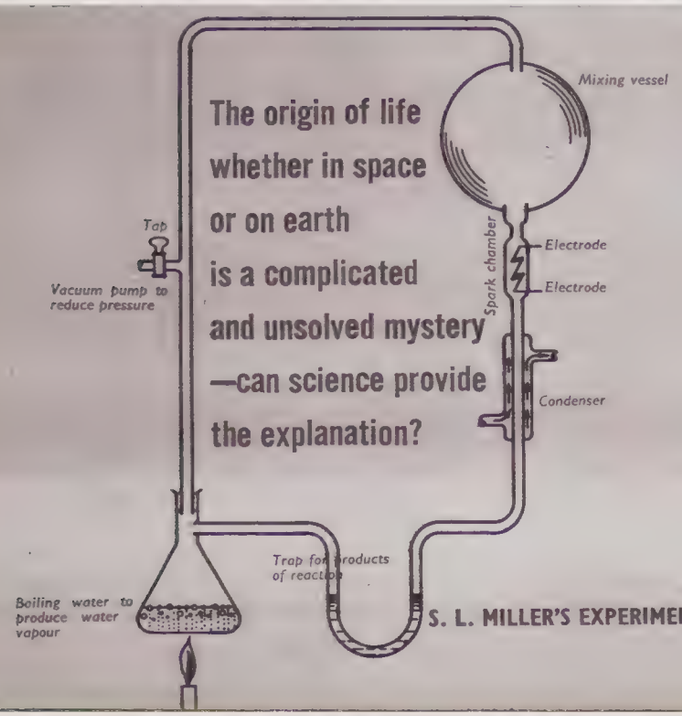
If these meteorites are formed by a planet breaking up then that planet could possibly have supported life. An intriguing possibility is that these meteorites come from outside our solar system or even from outside our Galaxy. If so, could perhaps even the life on Earth have been started by a meteorite falling from the skies?

Yet whatever mysteries lie in 'infinite space', the first life that most of the planets known to us are likely to experience will be—human life from Earth. For both America and Russia have successfully launched men into space and a landing on the Moon or one of the nearer planets is a distinct possibility in the relatively near future.

But it is no easy matter putting a man into space. First there is the problem of the sheer speed necessary to escape the Earth's gravitational pull.

In theory any speed is sufficient to carry a capsule on its journey into Space. In practice, as so often happens, things are very different. As a rocket rises from Earth it has to work con-

The origin of life whether in space or on earth is a complicated and unsolved mystery —can science provide the explanation?



S. L. MILLER'S EXPERIMENT

How life first appeared on Earth nobody knows, though many have opinions. Divine Creation, transfer from another planet, and an origin within the primaeval seas, are views which all have supporters. Few, however, would disagree that the merest speck of life was enough to begin a process which resulted in the emergence of both the plant and animal life that we know today. The doctrine of *Natural Selection* proposed by Charles Darwin in 1859 is sufficient evidence for that.

Though, or may be because, the origin of life is such a mystery it is a problem on which scientists have worked and speculated for years. Many have studied viruses, so tiny that a million lying side by side form a line only one inch long. If the origin of life were small and simple, then perhaps a clue may be found in these, the smallest and most simple organisms—but no one has yet found it.

Other scientists have suggested that if, millions of years ago, the Earth's atmosphere were formed of hydrogen, methane, ammonia, and water vapour, these substances might somehow have united to form the first primitive kind of living protein. Maybe the energy of lightning helped in this process.

In a famous experiment performed in 1953 Dr S. L. Miller of the University of Chicago tried to discover whether this was so. For a week he kept an electric spark flashing in a chamber filled with gases the same as those contained in the earth's early atmosphere. At the end of this time he examined the materials in his flask and he found four different *amino acids*, the building blocks out of which body protein is formed.

The logical conclusion to this experiment was other experiments—to see whether amino acids could be joined artificially together in much the way that they are joined together in living tissue. This scientists have in fact achieved by adding to amino acids, material extracted from cell nuclei. The amino acids linked on to these *nucleotides*, linked together, and then broke loose in a chain. This chain was similar in pattern to the chains of amino acids which form the human body. The synthesis (construction) of life material had been achieved.

But this is as far as science has gone—as yet we have not been able to produce an entity which manifests the character which we associate with life.

THE GREATEST CHALLENGE THAT MAN HAS EVER FACED

tinually against the force of gravity pulling it downwards. So much fuel is needed for this that every rocket must speed away from Earth's gravitational field as quickly as possible. Major Cooper's *Faith* 7 was accelerated to 17,546 mph on its way to orbit 150 miles high, and even greater speed is needed if a capsule is to escape from the Earth completely. This speed is called *escape velocity* and at ground level it is 25,000 mph.

The period of powered flight employed to reach 17,546 mph was only five minutes, and herein lies one of the astronaut's greatest problems. During acceleration as fierce as this the forces pressing the body of the space traveller upwards are many times greater than the gravitational forces which he experiences on Earth. At times these forces may be as much as eight times as great.

'Blackout'

A further problem associated with high acceleration is the movement of blood within the blood vessels. As blood is liquid it tends to lag behind when the body is accelerated, and consequently it 'pools'. If the acceleration is headwards the blood pools in the leg veins and a 'blackout' may occur due to decreased blood flow to the brain. If the acceleration is towards the feet the blood lags behind in the head and neck and a 'red-out' results. To avoid disasters of this kind the couch in the Mercury capsule is arranged in such a way that during the launch the astronaut lies in a forward looking position. During the flight the capsule is rotated through 180° so that, as it decelerates during descent, he lies in a backward facing position. Thus during both acceleration and deceleration his body is at right angles to the direction of flight.

Just the opposite of the problems of high acceleration and deceleration experienced by the astronaut during launching and descent is the problem of weightlessness which is experienced as the capsule hurtles around the Earth in orbit. During this time the tendency of the orbiting capsule to fly off into space is exactly equal to the force of gravity pulling it towards Earth. Under these conditions objects no longer gravitate towards Earth but remain in any position in which they are placed, even in mid-air! Furthermore it is as easy, or as difficult, to stand one way up as it is to stand the opposite way.

Weight troubles

At one time it was thought that weightlessness would be a great hazard to space travellers, but experience with the short flights so far undertaken has proved it not at all dangerous. Scott Carpenter in *Aurora* 7 even found it amusing and he was delighted with the way in which he could spin his camera around in mid-air as he orbited the Earth at 17,500 mph.

In the long flights which will have to be undertaken if man is to one day reach the planets, weightlessness may perhaps prove more troublesome. The body is accustomed to the effort needed to move about while under the influence of Earth's gravity—during prolonged weightlessness muscles may weaken through disuse and the mechanism controlling blood pressure may slacken. It may be that in a spacecraft these changes would not be noticed, but as soon as the traveller landed on a planet with a gravitational field he might well find himself in difficulties.

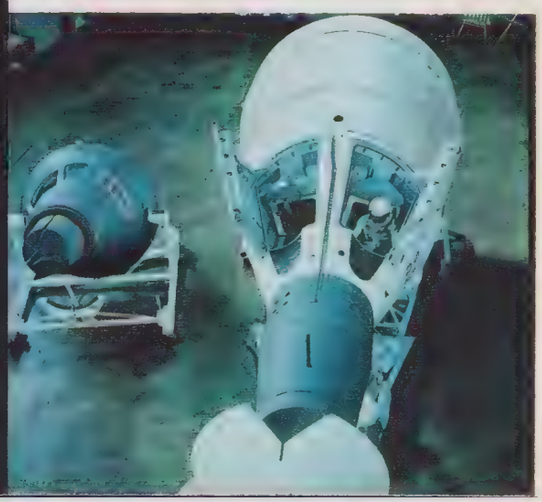
Scientists are working on all these, and other problems. Their ideas for food range from meat which can be squeezed from tubes like toothpaste to growing minute plants in tanks which will provide a self-producing food supply. The water shortage might be met by using the same water over and over again for it is not difficult to recover the water which is lost daily in the breath, sweat, and urine.

Above: pointing out into space the tiny Mercury capsule is poised on top of the colossal rocket that will bear it and its astronaut skyward

Right: this unearthly scene could be from a science fiction film—in fact, it is a test for the engines of America's F1 moon rocket

Left: The astronaut's head peers out of the maze of wires and nobs of the Mercury capsule in which he will travel 17,500 mph 100 miles above the Earth

Right: The Mercury capsule and its larger successor the Gemini. With capsules like Gemini there will be more space in space



II. DATES OF EXAMINATIONS

1. The examination will be held in the Summer of 1963 and in January 1964 at the Ordinary and the Advanced levels. Special papers will be set in the Summer examination only.

Change those GCE dates!

Dear Editor, I believe that the date of the G.C.E. examinations should be changed because people are now asked to stagger their holidays and avoid the stampede in August.

If the examinations were moved to the end of the spring term, then holidays could be staggered from April to September for both working people and their children.

John Becketson (15), 11 Udimore Rd., Rye, Sussex.

Dear Editor, In my opinion it would be far better to hold G.C.E. examinations in the Easter Term. Then the school-leaver, knowing the results of his or her examinations, can go straight to a prospective employer at the end of the summer term. Then nobody would have to wait in suspense for the rest of the summer until the results come through.

Andrew Flynn (14), City Hotel, Truro, Cornwall.

There are many difficulties in the way of rearranging the GCE examinations. One interesting suggestion is that they should be held at the end of the Autumn term. This would give pupils a chance to use the long summer holidays for their revision. In addition January would be an excellent time to go up to university or for employers to take on new staff. What do other readers think?—Editor.

A Maori warrior today

'FIGHT FOR EVER'

Dear Editor, Your article on New Zealand interested me very much, particularly since you mention the Maori wars. One battle was fought at a Maori village named Orakau, near my home town.

The battle was fought in 1861 between the Maoris under Rewi Maniopoto and soldiers under General Cameron. Orakau is on a hill, so it was first heavily bombarded by artillery; then the soldiers went up the hill to see if anyone was left alive. They were not left long in doubt for the Maoris drove them right down the hill again.

The village was besieged for four days and subject to heavy artillery fire. The Maoris had a few rifles but were armed mostly with taiahas (spears) and meres (clubs). They were asked to surrender, but replied: 'We shall fight for ever, for ever.'

The Maoris ultimately escaped from the village with the loss of about 160 people. About 200 soldiers were killed, and it was considered a somewhat Pyrrhic victory for General Cameron, for all that was gained was an empty village.

M. R. Scorrar (14),
54 Reservoir Street,
Putaruru, New Zealand.

The British soldiers who fought the Maoris were full of praise for their valour and soldierly qualities.-Editor

WORLD COIN

Dear Editor, There was a most interesting article about Numismatics in KNOWLEDGE No. 90 in which was pictured a Maria Theresa thaler of 1780, struck in Austria.

These coins are still being struck today in various parts of the world, including our own Royal Mint. I have one struck in 1962, but bearing the date 1780!

The thaler is known as a modern 'world coin', and is standard currency in most countries bordering on the Red Sea. The native tribesmen accept this coin through long association, and show no interest in changing its design or date. There are many Maria Theresa thalers in circulation in the world today, mostly modern ones; those few remaining old coins must be very well worn by now.

H. Gilbert,
9 Bridge Street West,
Manchester 3.

POWERS OF FAITH

Dear Editor, You have probably heard of the Fire Walking Ceremony of India.

To take part in the fire walking ceremony, the Indians have to observe a few regulations; for example, they are not supposed to eat any meat from a week before the ceremony until it is over.

Their ceremony is held in front of the temple; the people taking part will walk on glowing embers spread in a pit about seven yards in length. They will not feel anything and their feet will not be burned. I have seen this ceremony several times but I still do not know why the walkers are not burned. I think it is because the Indians believe they will not get burned; they believe that they are walking along a piece of cloth spread over the fire by the god.

G. Gopalakrishnan (12)
Abu Bakar Div. (UP Est),
Sg. Patani, Kedah, Malaysia.

I am always fascinated by these stories of mind over matter. One scientist said that if everybody in the world concentrated very hard, their thoughts might manage to shift the Empire State building in New York a few inches!—Editor.

NEVER ON FRIDAY

Dear Editor, Many years ago British seamen would refuse to sail on a Friday, as they believed it to be unlucky. The Government decided to show how stupid this superstition was. So they laid the keel of a new vessel on a Friday; launched her on a Friday; named her *HMS Friday;* and sent her to sea on a Friday.

This plan worked perfectly except for one thing. Neither ship nor crew was heard of again.

Graham Watson,
Ashfield, East Keswick,
Nr. Leeds, Yorks.

Perhaps it sank on a Friday too.
—Editor.

SILENT STATION

Dear Editor, I live in Penang. It has a most remarkable railway station. No train has ever come to it. Penang railway station is unique in this respect for it only issues tickets—the passengers get on or off the trains at a point two miles away on the other side of a channel.

S. Ashok (11),
P.O. Box 160,
Penang, Malaysia.

In Britain, with the proposed cuts in our railways, we will soon have many stations that don't even issue tickets!—Editor.

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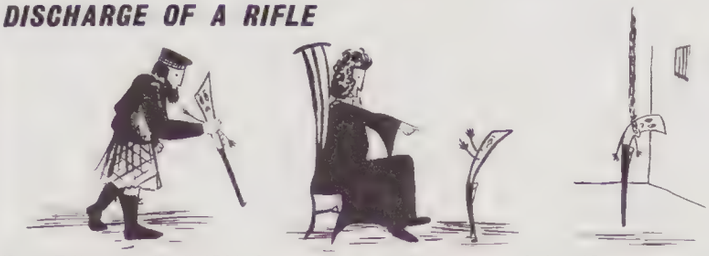
FROM THE EDITOR

Creating a new magazine is one of the most exciting tasks anyone can have. *Far & Wide* has been doubly exciting because it is a completely new type of magazine. We know that it will be read mainly by young people, but we also hope that it will appeal to anyone, whether young or old, who has a lively and enquiring mind and takes an intelligent interest in the world around him or her. In fact, it is my hope that anyone from nine to ninety will be able to get pleasure from *Far & Wide*.

Far & Wide is not only sold with *Knowledge*. It is also sold as a separate magazine. I would like readers of both to write to me—to tell me what you think of *Far & Wide*, about your ideas, experiences, interests and special knowledge. The writer of any letter published on this page will receive a guinea. The next issue of *Far & Wide* will appear in three months' time, so good-bye until then.

If you are not a regular reader of KNOWLEDGE you might like to take out a subscription to *Far & Wide*—this means you will get four more issues this year. Send a cheque/postal order for 6/- made payable to Knowledge Publications (4s subscription plus 2s postage and packing) to Department B, *Far & Wide*, 37 Hertford Street, London, W.1.

DISCHARGE OF A RIFLE



Dear Editor, In April 1781 there took place in Dumfries, Scotland, one of the strangest murder trials in legal history. The defendant was a *rifle*, which was found guilty!

While being pursued by the village constable after killing a farmer, the murderer dropped the rifle and made his escape. Later, to save his face, the policeman brought the weapon back and claimed that it was the murderer!

David McKnight (13),
10 Heathcot Place,
Glasgow W.5.

Laugh

and the world laughs with you;
Weep, and you weep alone;
For the sad old earth
must borrow its mirth,
But has trouble enough of its own.

Ella Wheeler Wilcox (1855-1919).

(*David Thorneycroft, The Mount, Cressage, Shrewsbury.*)

(*Peta Doran, 117 Neale Street, Bendigo, Victoria, Australia.*)

'My car's got a rattle.' 'What do you expect—it's only a baby car.'
(*Peter Menzies, 17 Burgh Road, Prestwick, Ayrshire, Scotland.*)

What kind of sense of humour have KNOWLEDGE readers ? On this page are the results of the second Knowledge Joke Competition in which KNOWLEDGE readers sent in their favourite jokes. Ten prizes of 30s were divided between British and Overseas readers.

'What denier is most suitable for a pay roll bandit?'
(*James Keys, 29 Haberton Park, Altnagelvin, Co. Londonderry, N. Ireland.*)

'Get tough with this lot—I'm right out of cigarettes.'
(*Clifford Hillier, 21 Hawkeridge, Westbury, Wiltshire.*)

'Next time you bring your boyfriend home for supper, make sure he's not as tough as the last one.'
(*Ann Hoskins, Flat 1, 37 Limes Road, Folkestone, Kent.*)

Put your hands up and don't make a sound!'
(*Stanley Bonnici, 31c Reid Street, Gzira, Malta G.C.*)

'I'm going to night-school, of course!'
(*Mary Xerri, 112/4 St Michael Street, Cospicua, Malta G.C.*)

'Beats me where he got the matches.'
(*Christopher Woodley, 30 Rue de la Violette, Geneva, Switzerland.*)

Consolation Prize of 5s

First man in bus to fellow passenger: 'Excuse me sir, but you've got a banana stuck in your left ear.'
Passenger: 'Sorry, I can't hear you. I've got a banana stuck in my ear.'
Peter Duffy, Riversdale, Finglas, Dublin 11, Ireland.

Once at a village fair a man was selling various articles, among which was a skull. The man said: 'Ladies and Gentlemen, this is the skull of none other than Oliver Cromwell!' 'It can't be,' remarked a man in the crowd, 'for that is a small skull and Oliver Cromwell had a large one.' 'I know that,' said the man, 'but this is the skull he had when he was a boy.' (*Robin Witkamp, P.O. Box 223, Kuwait, Arabian Gulf.*)

Any more jokes ?

If you have any more jokes send them in to us. We will pay 10s for each joke published in FAR & WIDE. So let's hear from you as soon as possible.—Editor.

HOW GENERAL IS YOUR KNOWLEDGE?

Many of these questions sound so simple that you may feel you must know the answer. But do you? 30 out of 40 right is excellent. 20 is very good indeed. (All the questions are taken from Knowledge Nos. 1 - 144.)

1. Which is (a) the largest (b) the smallest planet in our solar system?
2. Which is the most recently discovered planet?
3. What is the star nearest to the Sun?
4. What is the speed of light?
5. What is the average distance of the Earth from the Moon?
6. What is said to be the only structure built by man that would be visible from the Moon?
7. What is the most plentiful substance on the earth's surface?
8. If the known history of the Earth could be represented by 24 hours, how long would man have been on it?
9. Which is the largest state in the world in land area?
10. Which state has the largest population?
11. Which African city has the largest population?
12. Which are the coldest permanently inhabited places on earth?
13. How old are the oldest fragments of a human skull ever found?
14. Who was the first Pharaoh of Egypt and how long ago did he live?
15. How long ago did the siege of Troy take place?
16. Who was the last king of Rome?
17. Who was the first emperor of Rome?
18. Who was the first inhabitant of Britain whose name we know?
19. Where and when is St George thought to have been born?
20. What was King Arthur's legendary sword called?
21. When was Charlemagne crowned Emperor of the West?
22. Which English king gave his kingdom to the Pope?
23. Who was the first English king to have become Prince of Wales?
24. What was the first Shakespearian work to appear in print?
25. Who was Shakespeare's wife?
26. When did Britain's Royal Family obtain Buckingham Palace?
27. Who was the first Jew to become a British Prime Minister?
28. What is the fastest land animal today?
29. What is the largest animal today?
30. What is the largest bird today?
31. What is the largest fish today?
32. What is the smallest unit of matter into which an element can be divided?
33. What is the boiling point of water?
34. What is a prime number?
35. What is the average weight of a baby at birth to the nearest pound?
36. What are the cardinal points of the compass?
37. What is meant in painting by primary colours?
38. What are they?
39. What is unique about diamonds among precious stones?
40. What is the smallest race of people on earth?

1. (a) Jupiter (about 85,700 miles in diameter). (b) Mercury (about 2,900 miles in diameter). 2. Pluto (discovered 1930). 3. Proxima Centauri. 4. 186,326 miles per second. 5. 238,857 miles. 6. The Great Wall of China. 7. Water. 8. Within the last 20 seconds: out of 5,000,000,000 years man has been on Earth for about 1,000,000. 9. The Soviet Union (about 8.6 million square miles). 10. The Chinese Peoples Republic (population about 716 million). 11. Cairo. (population about 3,346,000). 12. Verkhoyansk and Oimyakon —temperatures descend to –90°F. 13. 500,000 years old, found in Java. 14. Menes, about 5,000 years ago. 15. About 3,200 years ago. 16. Tarquin the Proud (534-510 BC). 17. Caesar Augustus (October) (63 BC-AD 14). 18. Cassivelaunus, defeated by Julius Caesar 54 BC. 19. Lydda, Palestine, end of 3rd century AD. 20. Excalibur. 21. Christmas Day AD 800. 22. King John. 23. Edward II. 24. The poem 'Venus and Adonis' (1593). 25. Anne Hathaway. 26. When George III bought it from the Duke of Buckingham in 1762 (for £21,000). 27. Benjamin Disraeli. 28. The cheetah (70 mph). 29. The blue whale (up to 100 feet and 100 tons). 30. The ostrich (the male grows to a height of about 7 feet). 31. The whale shark. 32. An atom. 33. 100°C or 212°F. 34. A number which has no divisors other than itself and 1. 35. 7 lbs. 36. North, South, East, and West. 37. Colours a combination of which can make all other colours. 38. Red, blue, and yellow. 39. They are the only precious stones made out of one element—carbon. 40. Pygmies.

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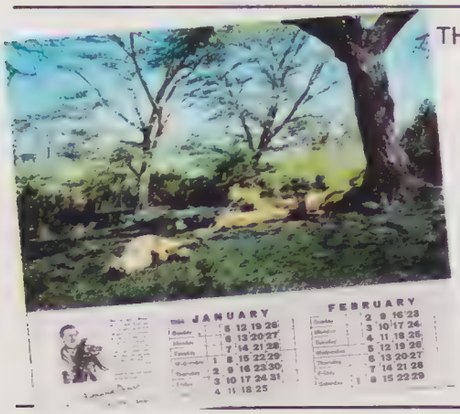

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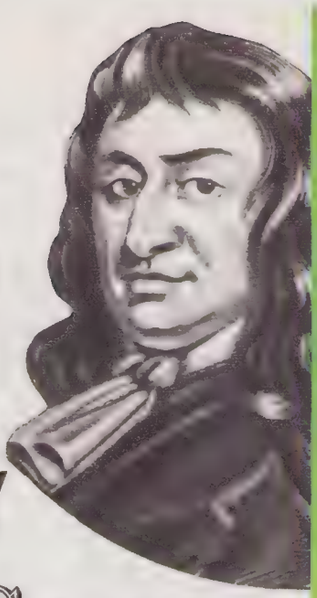
The Imperial State Crown (1838)

He tried to Steal the Crown JEWELS



A FASCINATING SHORT STORY THAT'S TRUE

80-YEAR-OLD Mr Talbot Edwards saw nothing amiss with the clergyman and his wife who had arrived at the Tower of London, and asked to see the Crown Jewels. To the Deputy Keeper they seemed to be a perfectly respectable couple. He willingly showed them the magnificent regalia, including the crown, orb, and sceptre that the King, Charles II, had had made for his coronation. Mr Edwards did not find it at all strange when that clergyman's wife suddenly became ill—in fact, Mr Edwards was all sympathy. His wife was summoned and the ailing woman taken into Mr Edwards's own apartment to be revived.

But while this diversion was taking place, Mr Edwards did not see the shrewd way the clergyman was examining the lay-out of the jewel house; as yet he had no idea that this 'clergyman' was none other than Colonel Thomas Blood, one of the most notorious adventurers and rogues of the period. Already Blood had tried to put into operation several colourful and outrageous schemes. These included an unsuccessful attempt to seize the Duke of Ormonde, Viceroy of Ireland, and hang him at Tyburn; and a fruitless conspiracy with a group called *The Fifth Monarchists* to set up a republic in London. Now he was attempting to bring off the biggest coup of his life—the theft of the Crown Jewels.

A few days after his first visit, Blood called at the Tower again with a present of some gloves for Mrs Edwards. He also suggested that the keeper and his wife might be interested in his nephew as a suitable match for their daughter, a young girl whom Blood had noticed.

Blood & his Accomplices making their Escape after Stealing the Crown of CHARLES the SECOND

The Edwards were delighted by the idea and a date was arranged on which Blood would bring his nephew to meet Miss Edwards. So, on the morning of 9th May 1671, Blood and three well-dressed men presented themselves at the Tower of London. Mrs and Miss Edwards had not yet appeared so Blood asked Mr Edwards to show them the jewels. As Edwards was doing this a cloak was suddenly thrown over him. He struggled desperately to get free and raise the alarm, but he was silenced by a few blows over the head with a wooden mallet.

Then Blood seized the King's crown which he stuffed under his cloak; another of his accomplices grabbed the orb and rammed it in his breeches; another tried frantically to hide the sceptre in his clothes but found it too long, so began to saw it.

So far the plan had worked perfectly—had it not been for a curious twist of fate Blood would almost certainly have got away. But by an extraordinary coincidence Edwards's son, who had been in Flanders, had returned that day. And, together with his friend, Captain Beckman, he was mounting the stairs of the jewel house the moment Blood and his friends were seizing the jewels.

Surprised by these two unexpected intruders, Blood and his companions fled, leaving the half-cut sceptre behind. Edwards and Beckman rushed after them. Blood fired a pistol at the guard on the drawbridge—although it missed him it was enough to make him fall down with fright. Just as Blood reached his horse, Beckman, a fast runner, caught up with him. Blood fired another pistol, but Beckman seized him and, with Edwards who arrived a few seconds later, secured the master criminal.

In the scuffle the crown was knocked out of Blood's cloak and fell on the pavement—a few jewels fell out of it. The orb was also recovered.

What punishment was great enough for Blood after trying to steal the King's most valuable personal possessions? Believe it or not he was acquitted! Summoned before Charles II he behaved with self-confidence and insolence, even uttering a veiled threat against the King's own life.

It was probably not this threat that made Charles pardon him, but the fact that Blood may once have been in the pay of Charles' favourite, Buckingham, who may also have inspired Blood's attempt to dispose of Ormonde.

In later life Blood became a popular figure around the court and curiously enough died a natural death. An epitaph for him goes as follows:

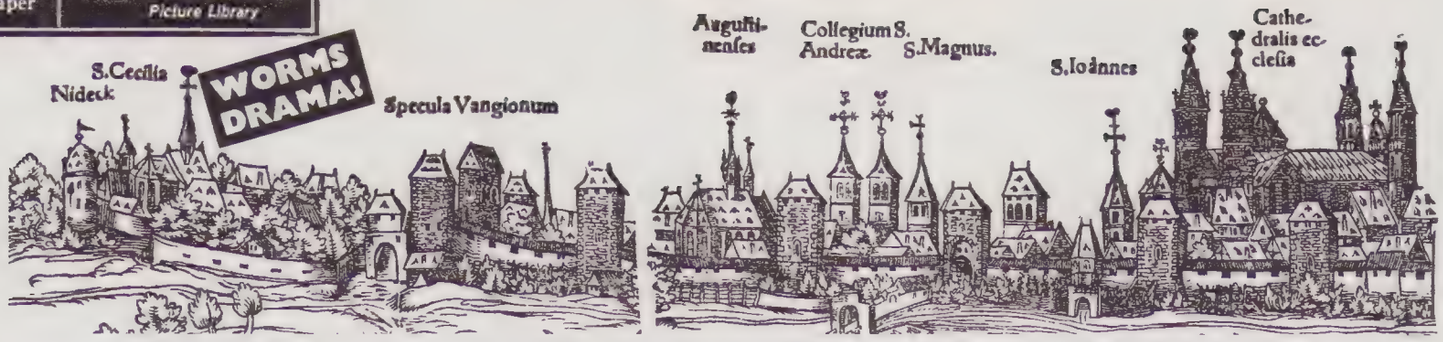
'Here lies the man who boldly hath run through,
More villainies than England ever knew . . .'

St Edward's Crown (1661)
The Sword of State
The Imperial Crown of India (1911)
The Sword of Justice to the Temporality
The Queen Mother's Crown (1937)
The Sword of Mercy
Queen Mary's Crown (1902)
The Sword of Justice to the Spirituality
The Prince of Wales's Crown (1728)

It is not known for certain which crown Blood took, but there is some evidence that it was St Edward's crown. Some of today's Crown Jewels are featured in the colour panels together with their dates.

F & W Historical Newspaper

Written by Christopher Falkus
Photos: Radio Times Hulton Picture Library



Worms—the Rhineland city within whose walls has taken place a clash of wills and beliefs that may rock Europe to its foundations

NO SURRENDER!

18th April, 1521

Doctor Martin Luther, the miner's son from Erfurt, has shown that neither Pope, Emperor, nor the Imperial Diet at Worms can make him alter his revolutionary views. This evening, before the Emperor Charles V, lord of Germany, Austria, Spain, Burgundy, and the Netherlands, he re-affirmed the doctrines for which he was excommunicated earlier this year.

The great Diet (parliament) before which Luther had been summoned to appear, ended in an uproar after he had denounced Pope Leo X and the Papacy, defied the Emperor Charles V, and, most astonishing of all, denied that the General Councils of the Church were infallible (always right).

It was already dark and the torches had been lit when Luther appeared in the bishop's palace at about six o'clock. The room was crowded. Many of the greatest men in the land: Electors, Archdukes, Princes, and Archbishops as well as Papal Legates, and the Emperor Charles V himself, were seated in gorgeous array. Yet Luther showed no sign of nerves as he went to his place. Nor did he falter in answering the questions put to him by the Papal advocate Johann von Eck. Eck reproved Luther for not replying to his question at the previous day's session; then he asked it again. *Would Luther recant what he had said in books which had already been condemned by both Pope and Emperor?* At once Luther launched into an attack on the Papacy and said that through the lies of the Pope the conscience of the Christian world was 'held prisoner and the German people destroyed with incredible tyranny'. Eck interrupted to pour scorn on Luther for thinking he could interpret the meaning of the Scriptures 'which the most sacred doctors have sought for sweating day and night'. Then he called for a 'sincere, candid, and unambiguous answer without horns' as to whether Luther would revoke his books. Luther gave it—he would not!

Emperor cuts in

Towards the end of his speech Luther made an astonishing denial of the infallibility of the Pope and General Councils, and the uproar that ensued was cut short by the Emperor Charles himself who asked: 'Does Luther believe that General Councils of the Church can err?' Luther replied that they can and have. The Emperor replied: 'It is enough. Since he has denied Councils we wish to hear no more!'

This denial of Luther is also enough to have him burned as a heretic—but he is at Worms under safe conduct, and his powerful protector, Elector Frederick of Saxony, may well refuse to yield him up.

'I cannot and will not revoke'—Luther (in monk's robe) startles the Diet

WIND of CHANGE

Is the Pope about to suffer a major defeat in Germany? Luther's attack on the Papacy has been enthusiastically received here as a blow against the flow of German money, via papal agents, to Rome. And Luther has the support of 'nationalists' like Hutten who are identifying the cause of German freedom with freedom from Rome.

This hostility to the foreigner is clearly the main reason why rulers such as Frederick of Saxony have refused to condemn Luther. For if papal authority within Germany were weakened then their own power over the Church and all its revenues would clearly increase.

This places the Emperor Charles V in an almost impossible situation. If he sides with the German nationalists, his fanatically pro-papal subjects in Spain and Italy will resent it. On the other hand, in upholding the Roman element of the Holy Roman Empire Charles would clearly be ceasing to speak for the majority of German people.

Martin Luther

LUTHER SPEAKS 'WITHOUT HORNS'

This was the reply von Eck received when he asked Luther whether he would revoke his writings:

'Since then your majesty and lordships demand a simple response I will give one with neither horns nor teeth to this effect. Unless convinced by the testimony of Scripture or by clear reason —for I believe neither Pope nor councils alone since it is certain they have often erred and contradicted themselves— having been conquered by the Scriptures referred to and my conscience taken captive by the Word of God I cannot and will not revoke anything for it is neither safe nor right to act against one's conscience. God help me, Amen.'

CIVIL WAR THREAT

Elector Frederick's key role

The result of the Diet of Worms may be civil war in Germany. Two of the most powerful men in the country, the Elector of Saxony and the Elector of the Palatinate of the Rhine, support Luther in his attacks on the Pope.

Frederick, to whose domain Luther will now return, will hardly abandon his protege to be burned as a heretic. And there are many other German nobles who would fight to the death for Luther. Thus, if the Pope and Charles try to seize Luther by force or order Frederick to deliver him up to them, there will almost certainly be war.

It is certain that Charles has committed a grievous technical error in summoning Luther to appear before him at the Imperial Diet. It has enormously added to Luther's prestige and has shown how popular he is in Germany. In the fortnight which it took him to get from Wittenberg to Worms he was feted, cheered and acclaimed at every town through which he passed. His entry into Worms was compared by an observer to that of Christ into Jerusalem.

CLASH OF LEVIATHANS LIKELY

Francis I

Rift widens between Europe's two most powerful sovereigns

The black shaded lands are those owing allegiance to Charles. The striped are French. The arrow points to the Duchy of Milan, a possible area of conflict

A clash between the French King, Francis, and the Emperor Charles whose dominions stretch over much of western Europe, is likely in the near future. Many Frenchmen regard Charles's enormous empire as a direct threat to France, and consider that a showdown between the two most powerful sovereigns in Europe is inevitable.

Such a war has been expected ever since the election of 1519 when Charles was elected Holy Roman Emperor. This left Francis a bitterly disappointed and unsuccessful candidate for Christendom's most exalted secular position. It is thought that last year's flamboyant meeting between Francis and Henry VIII of England at the 'Field of the Cloth of Gold' was an attempt by Francis to gain the support of the English King in his projected war against Charles. But Henry's wife Katherine is the Emperor's aunt, and it is considered that conflict between Henry and the Emperor is at present unlikely. In any case, France is England's traditional enemy—until recently the Kings of England were trying actively to enforce their own claims to the French throne.

NO NEWS OF MAGELLAN

There is still no news of Ferdinand Magellan, the explorer who departed nearly two years ago on 10th August 1519 from Seville. His fleet of five ships set out with the object of reaching the Spice Islands of the Indies by sailing west. He hoped to find a strait to the south of the Great American Continent (which was discovered nearly 30 years ago by Columbus), and sail through it to the Indies.

England's Henry Denounces Luther

King Henry VIII of England has accepted the Papal condemnation of Martin Luther and ordered the monk's books to be publicly burned. Official sources indicate that he is contemplating publishing a work of his own condemning Luther's heresy.

TURKS THREATEN VIENNA

Information from Austria reveals that the Turks are massing on the Hungarian frontier not all that far from Austria.

Already advance troops are pushing into Hungary. The Turkish empire which covers vast tracts of Asia and Europe, now threatens to engulf the heart of the Holy Roman Empire, Vienna. The Turks, under the Emperor Suleiman, are united and formidable. The reconciliation of religious and political differences between the Italians, Germans, and French is now a matter of extreme urgency if the Pope is to organise a successful crusade against the Turks.

Suleiman the Magnificent—expanding westwards

THIS IS THE ANGRY YOUNG MONK...

Leo X

Von Eck attacks Luther at Worms

The 95 Theses—consternation at Wittenberg

Charles V

...WHO IS ROCKING GERMANY

During the last four months, the great, the noble, the holy, and the notorious have packed the streets of Worms. Yet the name on everyone's lips has been that of the excommunicated monk of Wittenberg, Martin Luther. Who is this man who has electrified Germany?

Martin Luther was born on 10th November 1483 at Eisleben. He was the son of a miner, and went to Erfurt University and gained a BA degree in 1501. In 1505 he gained his MA degree, placed second out of 17 successful candidates. His father wanted him to be a lawyer but Martin decided to be a monk and joined the Augustinian order at Erfurt. During his studies he accepted the post of lecturer at both Wittenberg and Erfurt universities. And in 1512 he became a Doctor of Theology.

As a monk he went through many spiritual crises before adopting the philosophy he has preached several times from the pulpit—that man is justified through 'faith', and that 'good works' are not necessary for Salvation.

Luther did not come to the notice of the authorities, however, until 31st October 1517 when he nailed 95 Theses against indulgences on the church door of Wittenberg Cathedral. (Indulgences are special graces and pardons for sins granted by the Church in return for some service or monetary payment). Since then he has scarcely been out of the public eye.

In a series of pamphlets he has denounced not only indulgences, but the Pope's claim to be supreme head of the church.

In July 1519, the distinguished theologian Dr Eck met Luther in a public debate at Leipzig where he enticed Luther into stating that a General Council of the Church could err in its conclusions. This was heresy, and in June 1520, acting on Eck's report, Pope Leo X signed a bull condemning Luther. The monk was unrepentant and in December he publicly burned the bull. The following January he was excommunicated.

Though Luther was condemned, he had a powerful protector. Frederick, the Elector of Saxony, was a great admirer of Luther, and was unwilling to withdraw his protection from his now famous professor. He claimed that Luther should not be condemned without a hearing by impartial (that is, German) judges. Eventually it was decided to summon him before the Emperor at the first Imperial Diet, or Parliament, of Charles's reign. The Diet opened in January of this year, but it was March before Luther was summoned and April 2nd before he set out, on promise of safe conduct to and from Worms.

This safe conduct must be particularly annoying to the Pope and his supporters, for the man who is in their eyes the biggest and most influential heretic in Europe, is still at large, unburned and undaunted.

What will the Emperor do now? In March he condemned the books. Now he must condemn the man.

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ROD CELLS AND CONE CELLS

It is estimated that in the human retina there are 125 million rod cells and 7 million cone cells. The names of these two types of cell are derived from the single cytoplasmic process which extends outwards from each cell. Some are long and thin in form (these are the rods); others are shorter and thicker and called cones.

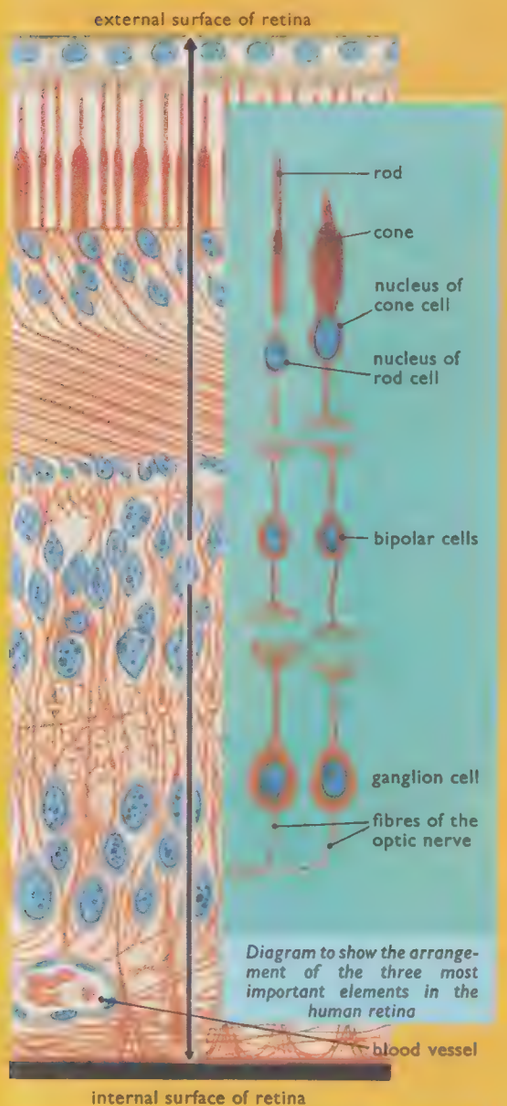


Diagram to show the arrangement of the three most important elements in the human retina

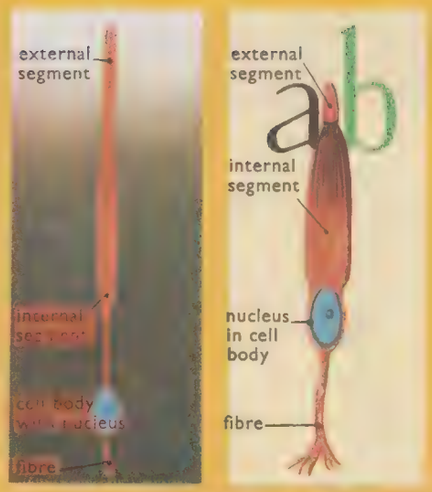
showing the arrangement of the various layers. Cell are red (magnification of 700 times)

The rod cells. Each rod cell consists of the *rod proper*, the *fibre*, and the *rod body*. The rod proper is the cytoplasmic process. It consists of two parts: a thin *outer segment* and a thin *inner segment*. There is good reason to believe that it is this part of the rod cell which is light sensitive.

The rod fibre extends from the inner end of the rod proper. At a point along its length it is greatly distended to form the rod body, in which the nucleus lies surrounded by a thin layer of cytoplasm.

The cone cells. As in the rod cells, the protoplasmic processes of the cone cells consist of an outer and an inner segment. The outer segment is short and very delicate, the inner is much thicker and stronger. At its inner end the inner segment is continuous with the cell body which contains the nucleus.

From the body of each cone cell there extends a stout fibre. This runs inwards through the substance of the retina to end in either a triangular or a bulbous swelling, the *cone pedicle*.



The light-sensitive cells of the retina. Left: a rod cell. Right: a cone cell

HOW THE RETINA WORKS

In the retina the rod cells and cone cells perform different functions. The rods are sensitive to light of low intensity and thus operate in twilight and near-dark conditions. They are not, however, sensitive to colour or able to provide particularly sharp visual images. The cone cells, on the other hand, are effective only in bright light, but under these conditions they provide images with sharp edges, and are sensitive to colour.

The mechanism by which light is converted in the retina into nerve impulses depends, at least in part, on the natural pigment called *visual purple*, or *rhodopsin*. This substance is found in the rods and is decomposed by light into *retinine* and *opsin*. In this process, so it is thought, small molecules are liberated which alter the metabolism of the rod cells and cause them to discharge the electrical impulses which pass to the optic nerve and thus initiate the sensation of seeing. It is suspected that a visual pigment similar to rhodopsin, though present in a lower concentration, serves a corresponding purpose in the cone cells.

THE TRANSMISSION OF VISUAL IMAGES TO THE BRAIN

The nerve impulses formed in the rod and cone cells are picked up by the outer processes of the *bipolar cells* in the middle layers of the retina and transmitted to the inner processes. Here they reach the end of the optic nerve along which they pass to the brain. As light rays travel through the retina to stimulate the rods and cones they pass in the opposite direction to that of the nerve impulses.

Under the fore part of the brain the two optic nerves fuse to form the *optic chiasma*. Here the fibres mix so that the fibres from the right half of each eye pass into the right optic tract, while those from the left half of each eye pass into the left tract. In the two optic tracts the visual impulses are transmitted to the *occipital cortex* of the corresponding side of the brain where they are appreciated as visual images.

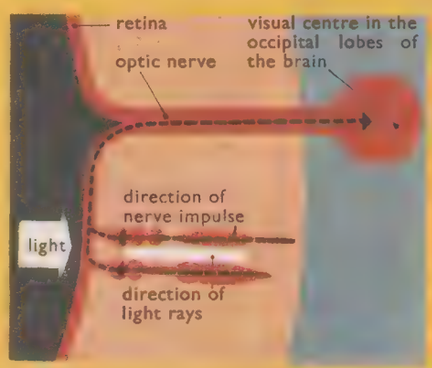
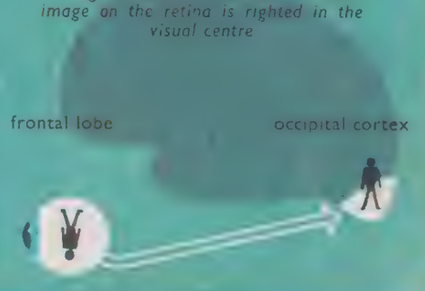


Diagram of the mechanism of the visual process. The rays of light forming the retinal image initiate the nerve impulses which travel to the brain

APPRECIATION OF VISUAL IMAGES

Since the lens system of the eye is a convergent one, the images which fall on the retinae are both inverted and reversed. Thus images of objects on the right of an observer fall on the left halves of the retinae and are transmitted to the visual cortex in the left occipital lobe. In the same way objects on the left of an observer cast images on to the right halves of the retinae and these pass to the right occipital lobe. In this way the visual cortex in each occipital lobe receives only those impulses generated by objects on the opposite side of the visual field. The situation, however, is even more complicated than this, for not only are the retinal images split and crossed over, they are also inverted. Fortunately, the visual cortex not only combines the images from the two sides, but also rights them, so that they are seen whole and the right way up.

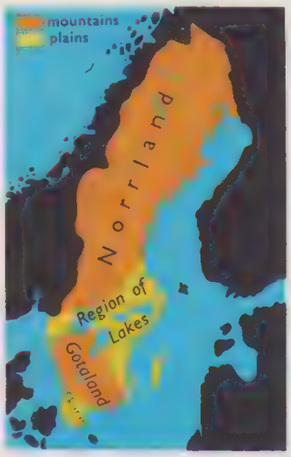
A diagram to show how the inverted image on the retina is righted in the visual centre



SWEDEN: physical and economic

ALTHOUGH Sweden is one of the largest countries in Europe, her population is only $7\frac{1}{2}$ million, most of which is concentrated in the southern third of the country. Large areas of the north are uninhabited, while others are visited only by semi-nomadic Lapps and their herds of reindeer. There are considerable expanses of bare rock and peat bog, and half the country is under forest, mainly coniferous; less than one-eighth is farmland.

In spite of these handicaps, Sweden is one of the most prosperous nations in the world (only the United States and Canada have a higher average income per head); for, by harnessing her hydro-electric forces, she has been able to make full use of her natural resources, especially timber and iron ore. It is not too much to say that the Swedish economy depends in fact on wood, iron, and water.



THE REGIONS OF SWEDEN

Sweden can be divided into four main regions – two highland and two lowland. Norrland occupies some two-thirds of the country and contains three longitudinal zones running north to south: the high mountains of the west, rising to nearly 7,000 feet; the dissected plateaux of the centre; and the lower coastal district. The whole region is crossed by rivers flowing into the Gulf of Bothnia. The second region, 'the Region of Lakes', is formed of fertile plains separated by large lakes. The South Swedish Hills (Gotaland) make up the third region, which, like the first, is infertile and thinly peopled. The fourth region, the Plain of Skane, is the smallest, but is very fertile and has been called 'the Granary of Sweden'.

Glaciation and the lakes

During the great Ice Age the whole of Sweden was covered by ice, and there are still small residual ice-fields in the north-west. Throughout the country the effects of the Ice Age can be seen, from the U-shaped valleys of Norrland to the hills and ridges of the centre and south. One result of glaciation was the formation of innumerable lakes, which occupy 8·5 per cent of the country's area. They are of two main types – the long, narrow 'ribbon' lakes of the northern mountain valleys, and the broader lakes of the south. Many of the former resulted from the damming of valleys by morainic material, while others were formed in depressions gouged out by ancient glaciers. In the south some of the larger lakes influence the climate around them; Lake Vänern is the third biggest lake in Europe. In lowland Sweden, too, many geological features, including the sinuous tree-covered ridges called eskers, were formed by glacial deposition.

One of the narrow, forest-fringed lakes of Norrland

Distribution of Swedish industry and agriculture

THE IMPORTANCE OF THE RIVERS

Sweden has many large rivers, and these play a vital part in the nation's economy. Glaciation led to the formation of numerous waterfalls and rapids, which can often be harnessed for the generation of electricity. This is particularly important since Sweden lacks a major coalfield. A number of big hydroelectric stations have been constructed since the war, but Sweden still has to import considerable quantities of coal, coke, and oil. The major rivers of Norrland are also used for floating logs to the sawmills, most of which are on the coast. In some parts, it would be seven times more expensive to transport the logs by rail.

INDUSTRIES BASED ON WOOD

These are the most important in the national economy, for they account for 25 per cent of industrial production and 40 per cent of exports. The main product is wood pulp, 70 per cent of which is exported, with Sweden controlling about 30 per cent of the world trade. The chief pulp mills are on the Gulf of Bothnia. Paper, furniture, and matches are also produced.

Iron ore and other minerals

Iron ore is Sweden's most valuable raw material after timber. It is mined in two main localities: in the Kiruna-Gallivare district and at Grangesberg (south-west of Falun). The former produces some 70 per cent of the country's annual output of 20 million tons, most of which is exported. As the Kiruna-Gallivare ore field lies north of the Arctic Circle, working conditions are hard. Each year, on average, 250 days have frosts, and there are five weeks of continuous darkness, during which time the ores are worked under electric light. The mining operations are dependent on electricity supplied by the Porjus hydroelectric power station. The ore is sent by rail to Narvik (in Norway) and Lulea, where special port facilities have been built, but the latter handles only half as much ore as the former because it is ice-bound during the winter.

Other minerals, including lead, zinc, copper, nickel, gold, silver, and arsenic, are also mined in Norrland.

Iron ore mining at Kiruna. The open-cast method is generally used so that the ore is in fact excavated rather than mined

OTHER INDUSTRIES

Another major Swedish industry is engineering, which accounts for one-quarter of her exports. A number of the products, such as S K F ball-bearings, Bofors guns, and Volvo cars, are very well known, while one-tenth of the world's ships are built in Swedish yards, mainly at Göteborg and Malmö. Göteborg also produces cotton goods, and oil is refined at Malmö. The capital of Sweden, Stockholm, has various industries including food processing and electrical engineering. Among other manufactured products are chemicals, woollen goods, and glass.

AGRICULTURE AND LIVESTOCK

There is little farmland outside the two lowland zones. Wheat and sugar beet are grown on the Plain of Skane; elsewhere dairying and pig rearing are more important. Despite intensive production, food still has to be imported. Foxes, minks, and beavers are bred for their skins.

EXPORTS
Ships, timber, machinery, iron ore, pulp, matches, paper, food, ball-bearings.

IMPORTS
Petroleum, oil, textiles, machinery, coal, iron, steel, food, fertilisers.

FACTS AND FIGURES

Area: 173,436 square miles
Population: 7·5 million

THREE LARGEST TOWNS AND PORTS
Stockholm: 806,900
Göteborg: 404,738
Malmö: 229,388

THE FOUR LARGEST LAKES
Vänern: 2,143 square miles
Vättern: 734 square miles
Mälaren: 440 square miles
Hornaven: 264 square miles

Chief products: machinery, ships, timber, pulp and paper, iron ore, iron and steel goods, chemicals, and textiles.

LORD PALMERSTON

A typical example of Palmerston's 'gun-boat' diplomacy. British ships destroy the Chinese war junks in Anson's Bay during the Opium War

THERE was an air of tension in the crowded House of Commons. The Foreign Minister was on trial. A vote of censure had been passed in the House of Lords, and defeat in the Commons could only mean his downfall. The minister, Lord Palmerston, rose to reply to his critics. For nearly five hours he held the attention of a rapt audience. He reviewed the results of his policy over the past 20 years, and there were cheers as he thundered: 'While we have seen thrones shaken, shattered, reviled, institutions overthrown and destroyed . . . this country has presented a spectacle honourable to the people of England, worth all the admiration of mankind.' Then he turned to the controversial question which had led to this 'trial' – the official support he had given to a disreputable British subject called Don Pacifico who had been wronged by the Greek government. Palmerston justified himself with words which thrilled his hearers: ' . . . as the Roman in the days of old held himself free from indignity when he could say *civis Romanus sum*, so also a British subject in whatever land he may be shall feel confident that the watchful eye and the strong arm of England will protect him against injustice and wrong.' This was Palmerston in 1850 at the height of his power. The censure motion was defeated.

A late developer

Lord Palmerston was the dominant figure in British politics for much of the 19th century. And Great Britain was fortunate to find in Lord Palmerston an expression of her liberal mood and an articulate voice to give vent to her ambitions at a majestic time in her history. Henry Temple, third Viscount Palmerston, was born in 1784, educated at Harrow and Cambridge, and entered the House of Commons at the age of 23. Two years later he was invited to join the cabinet as Chancellor of the Exchequer, but declined in favour of the less burdensome office of War Minister. But despite this early prominence it was not until he was nearly 50 that Palmerston came right to the front of British politics. He was one of the supporters of Canning (1770–1827), the brilliant Foreign Secretary; shortly after Canning's death Palmerston, along with other 'Canningites', broke with the Tory party. In 1830 Palmerston joined the Whig government as Foreign Minister, and his career as a European statesman had begun.

Strong man of the Foreign Office

1830 was itself a notable year. It saw the revolution in France that toppled the Bourbons and installed Louis Philippe on the throne; soon afterwards the Belgians rebelled against the Dutch, with whom they had been united at the Congress of Vienna (see page 2520). True to his liberal principles, Palmerston upheld the Belgian desire to be free; in this he found France to be an ally. But France wanted a French prince (the Duc de Nemours) on the Belgian throne, and this no British minister, let alone Palmerston, could stomach. After prolonged negotiations Palmerston got his way, and Leopold of Saxe-Coburg became king of Belgium.

Almost immediately Palmerston was involved in a new crisis. By a remarkable coincidence, Spain and Portugal both had young queens, Isabella and Donna Maria, who represented the 'liberal' parties. Both queens had 'wicked uncles', Don Carlos and Don Miguel, who wanted to usurp the thrones and rule despotically. With the help of France, Palmerston supported

the queens, and in 1833 both pretenders were expelled. The following year Great Britain, France, Spain, and Portugal joined together in a formal Quadruple Alliance. Palmerston was thrilled and called it 'a capital hit and all my doing'.

The Eastern Question

In the 1830s momentous things were happening in the Middle East. In 1832 war broke out between Turkey and her rebellious Egyptian vassal, Mehemet Ali, and, with his armies facing destruction, the Sultan of Turkey had appealed for aid. Palmerston was preoccupied with parliamentary reform (see page 1786) but Russia seized her chance, defeated Mehemet Ali, and forced Turkey to sign a treaty which was very advantageous to the Russians.

Palmerston did not miss his next opportunity however. In 1839 war again broke out between Egypt and Turkey; Palmerston intervened with Russia to save the 'integrity of the Turkish empire' – one of the main points of his (and Canning's) policy. The Second Treaty of London (1841) was only signed after Palmerston had risked war with France, who had major interests in Egypt. But the treaty was signed, and Palmerston's reputation soared.

War had also broken out in 1839 in the Far East, the so-called Chinese Opium War (see page 1850). Palmerston's bullying tactics led to the dispatch of the British fleet to bombard the Chinese into submission. The Treaty of Nankin (1842) confirmed British trade rights and surrendered Hong Kong to the British crown. By now Palmerston was in opposition, for in 1841 the Whigs were replaced by Sir Robert Peel. Peel fell in 1846, and the Whigs returned under Lord John Russell; Palmerston was again at the Foreign Office.

At once he was embroiled in further conflict with France over the 'Spanish marriages'. Palmerston stipulated that Queen Isabella's sister might marry a French prince only when the Queen herself had married and produced an heir, the object being to prevent a further union of France and Spain. But the French minister, Guizot, by methods Queen Victoria described as '*shabbily* dishonest', married Queen Isabella to the Duke of Cadiz, a very old man and most unlikely to give Isabella a child. On the very same day the Queen's sister married the French Duc de Montpensier. Palmerston was furious but could do nothing. He was more successful in 1847, however, in preventing a *coup* against the 'constitutional' government of Portugal.

Year of Revolutions

1848 was the Year of Revolutions. All over Europe liberals and nationalists were in rebellion against their despotic rulers. Palmerston privately supported these revolts, though the British government maintained a strict neutrality. But the revolutions of 1848 were, on the whole, political failures, and Palmerston was gravely disappointed when the despots in Austria, Germany, and Italy regained their power.

Palmerston in trouble

Ever since he had first become Foreign Minister Palmerston had completely dominated the Foreign Office. He regarded foreign affairs as his own private concern and often kept both the Prime Minister and Queen Victoria in ignorance of what was going on. His impetuous remarks, which often expressed his personal opinion rather than official policy, gradually alienated his superiors. He emerged triumphant from the Don Pacifico Affair (1850), but his triumph was short-lived. Trouble blew up again over the visit to England of General Haynau, the Austrian general who had cruelly suppressed the 'liberals' in 1848. Haynau was hooted and jeered at in the streets, and sticks and stones were thrown. Palmerston described the visit as a 'wanton insult to the people of this country'; Queen Victoria commented that she could 'as little approve of the introduction of lynch law into this country as of the violent vituperations with which Lord Palmerston accuses and condemns public men in other countries'. In December 1851, without permission, Palmerston congratulated Louis Napoleon on his *coup d'état*. This was the last straw, and Palmerston was sacked. Queen Victoria wrote to Leopold of Belgium: 'I have the greatest pleasure in announcing . . . *Lord Palmerston is no longer Foreign Secretary.*'

Two months later Russell resigned, and the Tories under Lord Derby took office; but they did not last long. Lord Aberdeen formed a Whig government which included, as *Home* Secretary, Lord Palmerston! Perhaps it was a pity that Palmerston was unacceptable at the Foreign Office, for it was largely blundering diplomacy that landed Britain in the Crimean War in 1853. As the most vigorous man in the cabinet, Lord Palmerston was responsible for the early strategy of the war, although he was not to blame for its appalling mismanagement. As the war dragged on the clamour in the country became too great to be ignored, and in 1855 Lord Palmerston himself became Prime Minister.

Palmerston assumes command

Almost at once the tide of war turned, although this was perhaps a coincidence. Russia was forced to sue for peace, and the Peace of Paris (1856) was a triumph for Britain. The election of 1857 declared overwhelmingly in favour of Lord Palmerston, and his firm hand had much to do with the crushing of the Indian Mutiny. But he was surprisingly defeated in the House in 1858, and for one year Lord Derby ruled again. But in the spring of 1859 Palmerston was back in power, almost as energetic as ever at the age of 75. His last years were ones of peace and prosperity at home and of relative quiet abroad. He indirectly but successfully aided the Italians in their struggles for independence between 1859 and 1861. But in 1862 a man emerged in Prussia who was more than a match for Lord Palmerston – Otto von Bismarck (see page 1332).

Palmerston lost the only encounter he ever had with the man who was to reshape Europe. For he foolishly promised to help Denmark prevent the Duchies of Schleswig and Holstein falling into German hands. Bismarck ignored him, and Palmerston had to back down; Denmark formally handed over the Duchies on 30th October 1864. Almost exactly a year later, on 18th October 1865, Palmerston died. That date marked the end of an era. It did not mark the end of British greatness but brought to a close the period in which Britain was able to intervene in the affairs of any country, and when she had a minister with a mind to do it.

Lord Palmerston (1784–1865), *who ensured that British influence was felt in every corner of the globe*

CITIES AND TOWNS OF IRELAND

Orangemen's Day celebrations in Belfast commemorating the famous Boyne Campaign

THERE are only two big cities in Ireland (see page 246): Dublin (pop. 535,488) and Belfast (pop. 416,500). Dublin we have already looked at on page 1834.

An industrial city

Ireland's two great cities are very different in character. Dublin, with its elegant, symmetrical Georgian streets and squares, and magnificent buildings like the Customs House, the Bank of Ireland, and Trinity College, bears the mark of the 18th century. Belfast, on the other hand, is rather like many of the cities that became large and important with the industrial expansion of the 19th century – in fact, it only officially became a city in 1888.

But Belfast's prosperity began long before this with the arrival of the Presbyterians from Scotland in the 17th century. It soon became an export outlet for Ulster's linen trade. In 1800 its population was 100,000 – but as yet it could not match Dublin as one of the great cities of Europe.

In the 19th century the growth of the cotton industry in Belfast brought a more rapid expansion – and by the end of the century the population had reached 350,000. In 1920 Belfast became a capital (see pages 1484 and 2240) – the seat of government of the six counties of Northern Ireland which did not form part of the Irish Free State. The Parliament of the North of Ireland is situated just outside Belfast at Stormont.

Although Belfast today is not a beautiful city, it has some impressive buildings, including the City Hall. Moreover, it is surrounded by some fine natural scenery. It is situated at the head of the Belfast Lough, 12 miles from the sea, and dramatic hills like Divis (1,574 feet) and Cavehill (1,182 feet) rise above it.

Belfast is one of the main industrial towns of the British Isles. This century has seen the rapid growth of two new industries: aircraft manufacture and shipbuilding. Belfast's most famous firm is probably that of the shipbuilders Harland and Wolff, who built up the biggest shipyard in the world. Belfast is also an important port and has a famous university, Queen's University, and some distinguished schools.

City of the siege

Northern Ireland's second city is Londonderry (pop. 53,744). Londonderry's original name was just Derry (meaning an oak wood). In 1613, however, it was granted to the City of London – hence the name Londonderry. In 1689 it withstood one of the most famous and most sung-about sieges in history. The Earl of Antrim's Catholic regiment, which supported James II, had previously been ordered by the King to occupy the city. The citizens were uncertain whether or not to resist the soldiers, but the apprentices of the city decided for them. Just as Antrim's soldiers were 300 yards away from the Ferry gate the apprentices slammed it shut, and the famous reply 'No surrender!' was given to James II's forces. The well-known song, *The Maiden City*, tells of the Earl of Antrim coming to the Ferry gate:

The Protestant Cathedral of St Finbar (1865–1869) in a quiet, elegant corner of Cork, the site of a 7th-century cathedral

Spanish architecture in Galway: one of the relics of Galway's commercial connections with Spain in the Middle Ages

Londonderry – a view over the river Foyle

'He summoned to defend her
Those sires of fearless race,
They shouted 'No surrender',
And slammed it in his face.'

More Jacobite forces were summoned, and in April the siege began. For 105 days the citizens had no communication with the outside world, and suffered considerable hardships, being reduced to eating cats and dogs. On 30th July, however, the boom which the besiegers had put over the river Foyle was broken, and thus supply ships could get in. The besiegers saw there was now no hope of taking the city, and so retreated.

Today Londonderry is the third biggest city in the whole of Ireland. The siege has not been forgotten, and in the Protestant cathedral, built in 1633, many relics of it can be seen. The main industry of the city is the manufacture of shirts and collars. Londonderry has a college of Queen's University, which is the Magee University College, and Foyle College for boys, founded in 1617.

An elegant city

The second city of the Republic, Cork (pop. 77,860), has been an important city from the 17th century onwards. It has elegant malls (wide thoroughfares), quiet quays, and magnificent mansions, often unchanged since the 18th century.

Cork is built on the beautiful river Lee which flows through the city in two streams – the 16th-century poet Spenser wrote:

'The spreading Lee that, like an island fayre,
Enclosed Cork with his divided flood.'

But despite its quiet elegance, Cork, until recently, had some of the worst slums in Ireland.

Cork's most famous sound is that of the 'sweet' bells of St Ann's Church, Shandon. Its red and white sandstone steeple has given rise to the rather inconsequential ditty:

'Partly coloured like the people,
Red and white is Shandon steeple.'

Cork is the centre of Ireland's motor industry. Henry Ford built his first European factory for producing tractors in Cork, and the present Ford works is the largest in Ireland. Dunlop's also have a rubber plant there. Cork's port is the second largest in the Republic. Many Atlantic liners stop just outside Cork at Cobh.

Cork has a constituent college of the National University of Ireland, of whose architecture Macaulay, the 19th-century historian, wrote: 'It is worthy to stand in the High Street at Oxford.'

City of the violated treaty

Limerick (pop. 50,497) was a great city in the Middle Ages. There is ample evidence of this in the fine cathedral of St Mary, begun in 1194, the ruins of the old wall, and the castle built during the reign of King John. Like Londonderry, Limerick had a famous siege during the Boyne Campaign (see page 1452). Gallantly defended by Sir Patrick Sarsfield, it had defied all the efforts of the Williamite forces to take it. But in October 1691 Sarsfield saw that the siege could not be continued indefinitely and so signed a treaty of surrender with the besiegers. Scarcely was the ink dry when a powerful French fleet sailed up the Shannon with an army that might have enabled Sarsfield to lift the siege. But Sarsfield kept his word and the fleet sailed back to France with his soldiers on board. The stone on which the treaty was signed can still be seen in Limerick. As it was claimed that the English later broke the treaty, the stone is known as 'The Stone of the Violated Treaty'.

In the 18th century Limerick became the social centre of the west of Ireland. The aristocracy and gentry built fine town houses there, many of which are still standing, particularly in O'Connell Street, the wide main street which runs the length of the city. Although Limerick is some way inland, it has an active port which is connected to the sea by the Shannon, the longest river in the British Isles. Its most famous old-established industry is lace-making, but this has been superseded by milling.

Waterford and Galway

The Republic has two other important towns: Waterford (pop. 28,138), and Galway (pop. 21,989).

Waterford's position in south-east Ireland near the mouth of the river Suir has made it a flourishing port; it is now the third biggest in the Republic. Its traditional industry, which has been recently revived, is the manufacture of the intricate and world-famous glass.

Galway is the metropolis of north-west Ireland. Its mediaeval trade with Spain has resulted in many of the houses having a Spanish character. It has a University College which is a constituent college of the National University of Ireland.

King John's Castle, Limerick, on the banks of the river Shannon

J. S. BACH

ONE of the most popular pieces of music played at weddings, and one that you almost certainly have heard, is *Jesu Joy of Man's Desiring*. This simple, lilting melody appeals to young and old, sophisticated and unsophisticated. But it was composed by a man much of whose greatest music can only be fully appreciated by the most knowledgeable of hearers – Johann Sebastian Bach.

Bach is the favourite composer of many lovers of classical music. His work is remarkably satisfying – intricate, and scored with an almost mathematical precision. His technical ability to manipulate harmonies is astonishing. In fact he was by far the greatest master of the fugue who has ever lived (the fugue is a form of music based on a single melodic *subject* or tune, repeated by other voices or instruments at different intervals). But Bach was so skilled that his complexities – the regular repetitions and perfectly constructed musical patterns – are apparent only to the expert.

Yet Bach was not an innovator. It is the brilliance, vigour, and precision with which he employed the musical forms of his time that have given him a place among the immortals of music. The music critic Alfred Einstein said of him: 'Bach is of the company of those masters with whom every age and every individual must arrive at a new understanding; and still his greatness has not been appraised, nor ever can be.'

A genius is usually not recognised in his time if his work is in advance of it. Bach's music was not in advance of his time – it strongly bears the stamp of the 18th century. But few of his contemporaries recognised him as a musical genius. He died better known as an organist than as a composer. His career was the story of a professional musician – a life lived in the comfortable atmosphere of churches and courts.

Bach was born in Eisenach in Germany on 21st March 1685 into a family of musicians. After his parents died when he was ten he was educated by his elder brother, an organist. In 1700 he was sent to Lüneburg, where he sang in the church choir and played the violin. Since one of the organists at Lüneburg had known the composer Schütz it was probably at this time that Bach became familiar with his work. Schütz was one of the greatest 17th-century German composers; his music was influenced by Italian composers like Palestrina, and the forms he used, including sacred motets for voices and instruments and his settings of the story of the 'Passion' according to the four evangelists, greatly influenced Bach.

Bach's first appointment was as organist at Arnstadt, when he was 18. But he annoyed the authorities by overstaying a month's leave to go to Lübeck to hear Buxtehude, the greatest organist of the time whose compositions also influenced Bach's work. He annoyed them too by his magnificent but unorthodox harmonisation of the chorales (Lutheran hymns), and in 1707 he left to become organist at Mühlhausen. After only a year there he left to become organist to the Duke of Weimar.

Weimar and Cöthen

Bach spent ten years as organist at Weimar, the following seven as Kapellmeister at Cöthen, and the rest of his life in Leipzig. At Weimar he wrote mainly church music, including some 30 cantatas (works for solo voices, chorus, and instruments). But at Cöthen the demand was for instrumental rather than any form of sacred music; his work here includes the six concertos for the Margrave of Brandenburg (the 'Brandenburg concertos') which are among the best-loved of all Bach's compositions; his French and English suites (influenced by the French composer Couperin); and the first 24 of his great collection of 48 preludes and fugues for the clavier.

Johann Sebastian Bach (1685–1750), *composer and organist*

Leipzig

In 1723 Bach was elected to the cantorship of St Thomas's School in Leipzig. He was now at the height of his powers, and returned to the writing of sacred music, for the city churches. This included nearly 300 cantatas, the *Magnificat in D*, the *Christmas Oratorio*, and his intensely moving *Passion according to St John* and *St Matthew*. His *Mass in B minor*, also written at Leipzig, is far too long to be performed during the service, but shows the same deeply religious spirit and sincerity which are characteristic of all Bach's religious music.

While Bach was pouring out his church music, he still found time to write a great deal of keyboard music, including the second collection of 24 preludes and fugues and the 30 *Goldberg variations*. Some of his keyboard music was written for his family, for he had married twice and had many children. In 1747 he was invited to play before Frederick the Great – this Bach regarded as one of the greatest moments of his life. But his eyesight, strained for years, finally gave out and he became blind. He died in 1750.

Bach brought the *polyphonic* music of his time (see page 2428) and German church music to their zenith; but little of his work was published during his lifetime. Much of his music, which was divided after his death between two of his sons (Wilhelm Friedemann and Karl Philipp Emanuel, who was a skilled composer in his own right), has been lost. His style was not to the taste of following generations, though it influenced both Mozart and Beethoven. We owe a considerable debt to Mendelssohn. He helped not only to rescue many of Bach's works from destruction but also to bring them the acclaim they have had ever since.

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15th-century hall; chair and round table are of a later period

A Tudor room with richly carved panelling and furniture

In Henry VIII's reign furniture was still heavy and clumsy; but soon after, Italian craftsmen were brought to England and through their influence the Renaissance style began to affect English panelling, carving, and furniture-making. Classical detail, like columns, medallions, swags, and cherubs, led to the showy carved ornament which ran riot in Elizabeth I's reign. Italian motifs were mixed up with grotesque masks and *strapwork* (bands of interlacing straps and ribbons) from the Netherlands, as surface decoration. Bulbous swellings, rather like melons, were carved on table legs, bedposts, and the columns of 'court' cupboards, in which the lower half was enclosed with panelled doors and the upper half had open shelves for display.

Fine craftsmen of the 17th century

In the early 17th century, which we call the Jacobean period after King James I, ornament became much more restrained. Proportions improved and carving gave place to plainer panelling on chair backs, settees, and cupboards. For the first time chairs were upholstered and covered with fine wool embroidery, also used in bed hangings. Chair legs and arms were now turned on a lathe as a rule, often in *baluster* (a short pillar – slender above, pear-shaped below) forms, and small gate-legged tables appeared. Under Cromwell furniture became very simple; chairs had low, padded backs and the seats were covered in leather held in place by brass-headed nails. It was at about this time that the Windsor chair appeared. This, with its saddle-shaped wooden seat, turned legs, and high curved and spoked back, originated in the country and continued to be produced for well over a hundred years.

With the Restoration of Charles II furniture became much more varied, comfortable, and ornate. The sophisticated court introduced French and Dutch fashions, and woodcarvers, joiners, and smiths learned new skills and techniques like the processes of *veneering* (overlaying with fine wood), *marquetry* (inlaying), and *japanning* (lacquering). Walnut replaced oak as the favourite material, and cane was used for chair seats and backs. The settee, the grandfather clock, and the writing desk came into fashion, and the chest was at last replaced by the chest-of-drawers.

In Queen Anne's reign furniture design became simpler and more elegant. Elaborate carving disappeared, and the curved *cabriole* leg, clean-cut from a single piece of wood, appeared in chairs, tables, and cabinets and remained in favour for over 50 years. Winged armchairs, upholstered settees, corner cabinets, looking glasses for the dressing table, and bureaux with sloping fronts and drawers below were introduced.

The great designers of the 18th century

In about 1720 mahogany began to replace walnut as the chief furniture wood. It is very hard, and can be cut in larger planks than walnut, enabling cabinet-makers to make large surfaces like table-tops without joins. In the 18th century the interest of wealthy patrons encouraged some of the greatest architects and furniture designers England has ever known. William Kent was the first architect successfully to design furniture for the houses he built – fine, dignified, but rather heavy pieces: bookcases and bureaux with columns and cornices, and marble-topped *console*

A Georgian dining room with Chippendale furniture (1750–1790)

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The Etruscan room, Osterley Park, designed and furnished by Robert Adam

tables, fixed to the wall with brackets and supported on scrolls or eagles.

1765 to 1800 was the greatest period of English furniture design and craftsmanship; at no other time has it reached such a high general standard. The most famous craftsman, if not the greatest designer, of the time was Thomas Chippendale, whose book *The Gentleman and Cabinet-Maker's Director* had appeared in 1754. It contained designs for a wide range of furniture including dining and side tables, library and writing tables, bureaux and bookcases, chests-of-drawers, wardrobes, and chairs. Chippendale was a superb cabinet-maker, and his furniture, perfectly proportioned and combining strength with grace, had immense influence on the style of 18th-century English furniture. He was skilled in adopting features from passing fashions like the Chinese and French styles, and adapting them to his own work. But the typical Chippendale chair, like those in the picture of a Georgian dining room, has straight front legs and stretchers, a wide comfortable seat, a cresting (top) rail in a cupid's bow shape and a carved splat (the central support in the chair back, joining the top to the bottom rail) in an open design.

Robert Adam

The outstanding designer of the later 18th century was Robert Adam, who introduced a new classical style based on his studies and observations in Italy, Greece, and Dalmatia. Furniture was an integral part of his designs for town and country houses like Osterley Park, which contains the charming 'Etruscan' room in the illustration – its decoration was inspired by the wall-paintings of houses at Pompeii. He used satinwood instead of mahogany to suit his white, gold, and pastel-coloured rooms. Every detail was planned by Adam himself, and the result was a cool, formal perfection seldom equalled since.

During the last 20 years of the great period of English furniture the two most famous names are Hepplewhite and Sheraton. George Hepplewhite designed and made furniture of great charm and elegance, in particular chairs which are distinguished by the graceful curves of their arms and back, with designs of Prince of Wales's feathers, lyres, or urns. The legs were straight and tapering, or cabriole. Thomas Sheraton designed straight-backed, rectangular chairs, and other drawing-room furniture with very pretty decoration, painted, or veneered with satinwood, sycamore, and chestnut. For inlay he used ebony, tulipwood, boxwood, and holly in bands, circles, fan-shapes, and stars; and would decorate the top of a table or front of a chest-of-drawers with coloured medallions.

19th and 20th centuries

The early 19th century is the period of the elegant Regency style. English furniture followed the French imitation of Greek, Roman, and Egyptian styles. Chair legs curved outwards in a sabre shape; brass and ormolu inlay replaced marquetry, and eagles, griffins, and swans were used in ornament and as supports.

Victorian furniture was very varied and, on the whole, heavy and clumsy, with richly upholstered sofas and chairs and large mahogany chests and wardrobes crowded together. In about 1860 mass production began; and towards the end of the century William Morris started a movement for better design and craftsmanship to counteract the shoddiness of many factory-made goods.

Today a style of furniture is evolving to meet the needs of people who have to live in a limited space, in flats or smaller houses. Once more the architect is influencing furniture design, and at the same time furniture-makers have learned how to use new materials like laminated plywood curved by steam, plastics, foam rubber, and metals, and to apply new techniques in the mass production of furniture. Now, for the first time, most people can buy well-designed furniture at prices they can afford.

Modern open-plan room with built-in shelves and contemporary furniture